M/045/0077
cc: Leslie.

Notice of Intention

To Begin a Large Mining Operation

Geneva Rock Products, Inc.

N. Grantsville Quarry

DOGM NO.

Submitted by:

Geneva Rock Products, Inc.

1565 W. 400N.

Orem, UT 84057

To:

Utah Division of Oil, Gas and Mining
1594 West North Temple, Suite 1210
Salt Lake City, Utah 84114-5801

M0450077
cc Leslie

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Geneva Rock Products – N. Grantsville Quarry – NOI

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R647-4. Large Mining Operations

R647-4-101. Filing Requirements and Review Procedures

This NOI is submitted to the Utah Division of Oil, Gas and Mining (DOGM) in compliance with part R647-4 of the Utah Minerals Reclamation program by Geneva Rock Products, Inc.

The proposed quarrying operation is located in Tooele County, Utah, on a 539-acre parcel owned by Geneva Rock Products, Inc. (Geneva). This site has not previoiusly been mined, but is situated adjacent to a limestone quarry owned by Utah Portland Quarries, Inc., a division of Buzzi Unicem. Portions of the proposed quarry is located in Sections 16, 17, 19 and 20 of T2S, R6W, SLBM.

R647-4-102. Duration of the Notice of Intention

It is understood that, when approved, this NOI, including any subsequently approved amendments or revisions, remains in effect for the life of the mine. However, Geneva acknowledges that the Division of Oil, Gas, and Mining (DOGM) may review the permit and require updated information and modifications when necessary.

R647-4-103. Notice of Intention to Begin Large Mining Operations

Geneva's NOI addresses the requirement of the rules listed in this section as follows:

104. Operator(s), Surface and Mineral Owner(s)

105. Maps, Drawings, and Photographs

106. Operation Plan

108. Hole plugging Requirements

109. Impact Assessment

110. Reclamation Plan

112. Variance

113. Surety

R647-4-104. Operator, Surface and Mineral Owners

1. Mine Name: N. Grantsville Quarry
2. Operator: Geneva Rock Products, Inc.
   1565 West 400 North
   Orem, Utah 84057

   Phone: 801-765-7800
   Fax: 801-765-7830
   Email: http://www.genevarock.com/

   Type of Business: Corporation
   Utah Business Entity No.: 570716-0412
   Local Business License No.: 2008088
   Issued by: Tooele, City

   Registered Utah Agent: Al Schellenberg
   1565 West 400 North
   Orem, UT 84057
   Phone: 801-765-7800
   Fax: 801-765-7830
   Email: aschellenberg@genevarock.com

3. Permanent Address: Geneva Rock Products, Inc.
   1565 West 400 North
   Orem, UT 84057
   Phone: 801-765-7800
   Fax: 801-765-7830
   Email: http://www.genevarock.com/

4. Contact Person for Permitting, Surety, Notices:
   Mike Edwards
   Geneva Rock Products, Inc.
   P.O. Box 538
   Orem, Utah 84059
   Phone: 801-281-7890
   Fax: 801-641-2117
   Email: medwards@genevarock.com

5. Location of Operation: Portions of S.16,17,19 & 20, T2S, R6W, SLBM
6. Ownership of Land Surface: Geneva Rock Products, Inc.
   1565 West 400 North
   Orem, UT 84057

7. Owners of Record of Mineral to be Mined:
   Geneva Rock Products
   1565 West 400 North
   Orem, Utah 84057

8. BLM Lease or Project File Numbers:
   None

9. Adjacent Land Owners: Utah Portland Quarries, Inc
   C/O Buzzi Unicem
   100 Broadhead Road
   Bethlehem, Pennsylvania 18017-8989

   Jay A. Anderson
   799 N. 600 W.
   Grantsville, Utah 84029-9366

   U.S.D.I. Bureau of Land Management
   2370 S. 2300 W.
   Salt Lake City, UT 84119
   (801) 977-4300

   Grantsville, LLC.
   944 E. 800 S.
   Bountiful, UT 84010

10. Have the land, mineral, and adjacent owners been notified in writing?
    No.

11. Does Permitee/Operator have a legal right to enter and conduct mining operations on the land covered by this notice? Yes.

R647-4-105. Maps, Drawings, and Photographs

Maps, drawings, and photographs are provided as requested on Form MR-LMO. The base map Checklist is referenced below by letters and parentheses (a,b,c,d,or e) that represents which of the bullet items is addressed on each map.

105.1.Base Maps: Figures 1 and 2

Figure 1 Base and Mine Location Map and shows the mine area and surroundings and is printed at a scale of 1"=3000'. It shows streams, springs, water bodies, road, buildings, topography and utilities as required in (B). There are no known underground workings on the site. The only utility within the proposed permit area is an overhead power line going through the property in an east-west direction along the 2 track access road.

Figure 2 Land Ownership Map is printed at a scale of 1"=900' and shows the property boundaries, surface ownership of the mine and adjacent lands, and access routes.

105.2. Surface facilities maps: Figures 3 and 4

Figure 3: Existing Contours Map, is printed at a scale of 1"=600' and shows existing surface facilities, roads and washes that pass through or near the lands to be affected. There are no test borings, pits, or boreholes.

Figure 4: Mine Plan Map, is printed at a scale of 1"=600' and shows drainage control structures, topsoil storage areas. There is no overburden or waste rock, thus no storage areas are shown. No waste water is generated in this mine, therefore no discharge areas are shown. Storm water is initially impounded in a retention pond near the entrance of the quarry, then later against the high wall in the back of the quarry. After the quarry has been sufficiently developed to hold the water against the high wall the retention pond will be used as a reservoir for the wash plant.

Figure 4a: Phasing Map, is printed at a scale of 1"=600' shows the phased progression of the mine and the respective bonded acreage of each phase.

105.3. Reclamation Treatments: Figure 5

Figure 5 is a Reclamation Treatments map. This map is printed at a scale of 1"=600'. It shows details about reclamation treatment areas, including what disturbance, such as high walls, topsoil stockpiles and roads, will be reclaimed. A border outlining the extent of the area to be

reclaimed vs. the affected area is shown. While no topsoil will be spread on the high walls because they are too steep to re-vegetate. The benches will be covered with topsoil and re-seeded.

All high walls will be left at a benched 1H:1V These areas are shown on the map. The unconsolidated top layer of alluvium will be sloped at 2H:1V. All floor slopes will be 3H:1V or less.

104.4. Additional Maps:

Figure 6 shows cross-sections of the reclaimed pit.

Figure 6a shows the detail of how the high walls will be benched.

Figure 7 is a Utah Division of Water Rights map showing area water rights.

Figure 8 is a soils map printed at a scale of 1"=1,200'showing existing soil types.

Figure 9 is a Geology map showing the underlying geology of the mine.

R647-4-106: Operation Plan

106.1. Mineral to be Mined

The N. Grantsville quarry will produce crushed and/or screened aggregate for construction materials including concrete and asphalt.

106.2. Type of operation to be conducted

Geneva Rock Products, Inc. (Geneva) primarily extracts aggregate rock for use as road base, landscape rock, and other construction products. The projected future use of the aggregate will also include concrete and asphalt production.

Mining Operation

Geneva will remove rock from the active mine area by drilling, blasting, and dozing methods. New disturbance occurs at the top and sides of the hill slope. The hill slope will be developed in phases, shown in order of development on **Figure 4a.** Each numbered area contains enough material to last for roughly 10 to 15 years. Mining may extend into the proceeding area prior to completely mining out the previous area in order to maximize safety, rock quality, and

production needs. All haul roads will be confined within the disturbance boundaries or upon the Little Mountain Road which is maintained by Tooele County.

Rock is removed by drilling and blasting to release a "lift" of rock approximately 50 feet deep and up to two acres in size. Extraction of this loosened rock occurs by sequentially working downward through the exposed rock. When all blasted rock is removed from the first lift, another blast is set to free this lower lift of rock for removal and processing. Rock is removed from the working face or feed zone; with a loader and either placed in dump trucks or transported directly to the processing area where the rock is separated and adjusted to specific sizes for further processing. The facility is a crushing and sizing operation. Sizing for the final product is determined by specifications provided by customers.

Crushing Operation

Once the rock is removed from the working face, the material is brought a short distance to the "jaw crusher" by a front-end-loader where it is broken down to 6-8" for initial sizing. The crushed rock is moved by conveyor to a 3,000 to 5,000 CY surge hopper. Aggregate is metered from the surge hopper, by conveyor, to the secondary crushing unit, which may either be a primary horizontal impact crusher, or a roller cone crusher. The secondary crusher crushes the aggregate to 2" minus. Conveyors then direct the aggregate to 3-deck sizing screens to split the aggregate stream into three different product sizes.

Any oversize aggregate not passing one of the three screen sizes is directed by conveyor to a tertiary crusher, which is either an impact crusher or a fine crushing, roller cone crusher. The aggregate from the tertiary crusher is then directed back up to the 3-deck screens in a closed circuit. The crushing plant is controlled by motor control circuitry located in the control tower manned by the crusher operator.

The finished products come out of the crushing plant and are conveyed or moved by loaders to the aggregate storage piles where they are stored until sold. When an order is placed for a particular size aggregate, it is loaded into trucks for delivery to the customer or transported to either the concrete plant or asphalt plant for further processing. All conveyors are equipped with spray bars that spray water at drop points to control fugitive dust.

Blasting Practices

Blasting will be used in the mining process at the N. Grantsville Quarry. Blasting is not conducted by Geneva, but is subcontracted out to a qualified company trained in blasting design and practices. All blasting will be done in accordance with MSHA regulations. Unless needed, no seismic monitoring of blasting will be done at the N.Grantsville Quarry.

The mine will conduct blasting up to 50 times per year. Blasting rounds include 25 ounce down-hole primers, detonator cords, and Ammonium Nitrate-Fuel Oil (ANFO) pellets. Typical blasting design is 50 to 100 holes drilled 50-100 feet deep. It is estimated that each hole will be set on a 13ft. X 13 ft. grid.

Before blasting occurs, the tower sounds a warning siren to alert all personnel of impending blast; at which time all personnel and equipment are removed from quarry area. The siren is then sounded again and the blaster turns on his emergency flashing lights. The blast is then detonated. No one enters the blasting zone until the blaster gives an all-clear whistle.

Concurrent Reclamation

No reclamation will take place within the first 20-year block. Increased production will force utilization of all additional mined-out acres for staging, sorting, or processing. Reclamation will take place once the quarry is mined out. Reclamation is discussed in Section 110 below.

106.3. Estimated Acreage

Approximately 539 acres will be disturbed over the life of the mine. This figure includes all access roads, storage piles, processing areas and mine areas. There is presently no ground disturbance on the proposed mine area. The Geneva will confine its mining activities to 95-acres for the next 10 years.

Table 1: Areas to be affected during the next 10- years, and over life of Mine

Area	Total Affected Acreage	Description and Notes	Total Cubic Yards of Topsoil Salvaged
Existing Mine Disturbance	0	Pre-existing disturbance	0
Areas of new mining disturbance	62	To be disturbed in 1-10 years	50,013
Overburden and waste dumps	0	All mined materials are processed and sold	0
Ore and product stockpiles	20	20 acres	16,133
Topsoil stockpiles	0	The present acreage of haul roads in the pit will be maintained	0
Plant Staging Areas	10	Future Asphalt & Concrete Plants	8,067

Sediment Control Ponds	3	Run-off is contained in bermed work area or storm retention basin	2420
Total 10-year disturbance	**95**		**76,633**
Phase 2	95	To be disturbed during 10-20 years	76,633
Phase 3	156	To be disturbed during 20-30 years	125,840
Phase 4	193	To be disturbed during 30-40 years	155,687
Total disturbance – life of mine	539		434,793

106.4. Nature of material, including waste rock/overburden, and estimated tonnage

Ore

The annual amount of ore generated is greatly dependent on quarterly demand. We project the average annual production for the next five years to average 750,000 tons (395,000 CY) per year.

Historic Mining

Mining has occurred on lands adjacent to the N. Grantsville Quarry for over 100 years. Most of the mineral extraction in the area has been for limestone to produce portland cement or for lime production. The quality and durability of the aggregate make it very useful as road building and construction aggregate.

106.5. Soils

All existing top soil will be removed and stored in a stable condition, and used for reclamation of disturbed areas.

Soils map units are shown on **Figure 8**, Soils. Samples of the top 6-inches of soil was collected at Point TP-1, through TP-6 at random locations to represent the diversity of soils located on the mine property. These samples were taken to characterize soils in preparation for future soil salvage. The sample locations are shown on **Figure 8**. Analytical sampling results are shown in **Table 2** below.

Table 2: Analytical Results of Fall, 2008 Soil Samples, Top Six Inches of Soil*

Soil Parameter	TP#1	TP#2	TP#3	TP#4	TP#5	TP#6	Units
Texture	Loam	Loam	Sandy Clay Loam	Clay Loam	Loam	Clay Loam	Uniform Soil Classification
pH	7.44	7.28	7.43	7.56	7.47	7.29	@25°C, pH units
SAR(sodium absorption ratio)	.86	.56	.70	.74	.68	.92	
Percent Organic Matter	3.22	2.72	1.56	2.25	2.75	2.01	Total Volatile Solids as % of total sample
Nitrate Nitrogen	11.12	3.84	5.02	8.01	9.35	33.32	ppm
Phosphorus (as P)	21.12	4.05	4.70	5.88	14.46	6.31	ppm
Potassium (as K_2O)	579.20	195.2	188.8	412.8	438.4	284.8	ppm

The texture of all soil samples were consistent from top to bottom.

There are five soil types within the quarry boundary. These are the Abela gravelly loam, 2 to 8% slopes, Abela Very Gravelly Loam, 5 to 15 percent slopes, Amtoft-Rock Outcrop Complex, 30 to 70 percent slopes, and the Hiko Peak Very Stony Loam, 2-8% slopes and Ladar-Lundy-Rock outcrop association, 30-60% slopes (USDA NRCS, 2006). These soils are described in **Tables 3 and 4** below. **Figure 7** shows the locations of these soils within the mine area.

Table 3: Soil Descriptions for Grantsville Mine

Soil Type	Brief Map Unit Description	Ecological site	Forage Productivity: high, normal, low years
Abela gravelly loam, 2-8% slopes	Fan remnants. Parent material is alluvium derived from limestone and/or quartzite. Well drained. No flooding. CaCO3 max at 40%, Gypsum max at 0%. Avail. water cap. moderate.	Upland Gravelly Loam (Mountain Big Sagebrush)	1,000 lb/ac, 800 lb/ac, 400 lb/ac

Soil Type	Brief Map Unit Description	Ecological site	Forage Productivity: high, normal, low years
Abela very gravelly loam, 5-15 % slopes	Fan remnants. Parent material is alluvium derived from limestone and/or quartzite. Well drained. No flooding. CaCO3 max at 40%, Gypsum max at 0%. Avail. water cap. low.	Upland Gravelly Loam (Mountain Big Sagebrush)	850 lb/ac, 650 lb/ac, 350 lb/ac
Amtoft-Rock Outcrop complex, 30-70% slopes	Mountain and hillsides. Parent material is colluvium derived from limestone and/or residuum of weathered limestone. Depth to lithic bedrock: 10-20 inches. CaCO3 max at 80%, Gypsum at 0%.	Upland Gravelly Loam (Mountain Big Sagebrush)	900 lb/ac, 700 lb/ac, 500 lb/ac
Hiko Peak Very Stony Loam, 2-8% slopes	Fan remnants of mixed alluvium. Well drained. No flooding. CaCO3 max at 35%, moderately sodic at 30 inches.	Semi-desert Stony Loam	700 lbs/ac, 600 lb/ac, 400 lb/ac
Lodar-Lundy-Rock outcrop association, 30-60% slopes	Mountainsides. Parent materials colluvium derived from limestone and/or residuum weathered from limestone. Well drained. CaCO3 max at 80%	Mountain Shallow Loam (low Sagebrush)	800 lbs/ac, 600 lb/ac, 400 lb/ac

Table 4: Soil physical and chemical characteristics based on NRCS data

Soil Type	Topsoil depth	Total Depth	CEC (meq /100g)	pH	SAR	CaCO3 %	CaSO4 %	Na Mmhos /cm	Limita-tions
Abela	0-11"	>60"	5-20	7.9-9.0	0	1-40	0	0-4	Cobbles, gravels
Amtoft/ Rock outcrop	0-9"	< 16"	5-15	7.9-9.0	0	20-80	0	0-4	bedrock
Hiko Peak	0-4"	>60"	5.0-15	7.9-9.0	0-13	15-30	0	0-4	cobbles

106.6. Plans for protecting and re-depositing soils

It is estimated that 95 acres of mining disturbance will occur in the next 10 years. At a 6 inch salvage depth, approximately 76,633 cubic yard of topsoil (see table 1) will be salvaged from this area. Depending on the location of the excavation each year (i.e. south facing or east and west facing slopes), actual soil salvage by year may be more or less than that stated above. All stockpiles will be surrounded by a berm to protect against soil loss.

Topsoil and vegetation (made up mostly of grasses, and brush) will be removed together with bulldozers, front-end loaders, and 14-ton to 45-ton dump trucks. Vegetation at the mine site will add negligible volume to soil stockpiles. Over the life of the mine, approximately 539 acres of total disturbance, and as much as 434,793 cubic yards (CY) of soil will be salvaged for reclamation.

More detail on topsoil stripping and protection is included in Sub-section 109.3 below.

106.7 Existing Vegetative communities to establish re-vegetation success

The project area ranges from 4,800 feet elevation at the northeast corner to 5,600 feet elevation at the southwest corner. The mine area will excavate into a minor ridge on the northeast side of Little Mountain, which is on the lower, east-side flanks of the Stansbury Mountains. Color photographs included in Appendix A show the pre-mine conditions at the mine site.

According to the NRCS Ecological Site description (See Table 3 above), the area to be mined is in the Upland Gravelly Loam (Mountain Big Sagebrush) Ecological site. Expected composition of this range site on an average year is listed in Table 6 below. An estimation of abundance based on a vegetation survey conducted May 23, 2007 is listed in Table 7 below. Abundance was ranked in declining order of prevalence as: Abundant, Common, Uncommon, Locally Common, Occasional, and Rare. Abundance was determined by ocular estimate while data was collected, with adjustments to those ratings made the day afterward based on the entire day's observations and quantitative data collected.

Table 6: Expected plant species by percent composition for the Mountain Stony Loam Range Site

Scientific name	Common name	Composition (%)
Shrubs, Trees, and Sub Trees		
Artemisia tridentata	Mountain big sagebrush	25

Purshia tridentata	Antelope bitterbrush	10
	Other perennial shrubs	5
Forbs		
	Perennial forbs	5
Grasses		
Pseudogroegneria spicata	Bluebunch wheatgrass	25
Poa nevadensis	Nevada bluegrass	15
Stipa comata	Needleandthread grass	5
	Other perennial grasses	5

Table 7: Plant species recorded during the May 23, 2007 Vegetation Survey

	Scientific name	Common name	Abundance
	Shrubs, Trees and Sub-trees		
	Artemisia tridentata	Big sagebrush	Abundant
	Chrysothamnus nauseosus	Rubber rabbitbrush	Rare
	Grayia spinosa	Spiny hopsage	Rare
	Gutierrezia sarothrae	Broom snakeweed	Common
	Juniperus scopulorum	Rocky Mt juniper	Locally common
	Tetradymia canescens	Spiny horsebrush	Uncommon
	Forbs		
*	*Ambrosia tomentosa*	Ragweed	Uncommon
	Antennaria sp.	Pussytoes	Common
	Astragalus utahensis	Utah milkvetch	Uncommon
	Astragalus sp.	Vetch or locoweed	

	Scientific name	Common name	Abundance
	Brodiaea douglasii	Brodiaea	Uncommon
	Calochortus nutalli	Sego lily	Common
	Castilleja sp.	Desert paintbrush	Common
	Crepis accuminata	Mountain hawksbeard	Uncommon
	Cryptantha rollinsii	Rollins cryptantha	Common
+	*Cirsium undulatum*	Thistle	Locally abundant
+*	*Erodium cicutarium*	Storksbill	Abundant
	Eriogonum (ovalifolium?)	Sulfur flower	Uncommon
	Hedysarum boreale	Northern sweetvetch	Occasional
	Onopardum acanthium	White evening primrose	Occasional
+*	*Tragopogon dubius*	Salsify	Common
	Grasses		
	Achnatherum hymenoides	Indian ricegrass	Rare
	Agropyron cristatum	Crested wheatgrass	Uncommon
	Psuedoroegneria spicata	Bluebunch wheatgrass	Common
+	*Bromus tectorum*	Cheatgrass	Common
+	*Elymus elymoides*	Squirreltail	Occasional
+*	*Poa bulbosa*	Bulbous bluegrass	Rare
	Stipa comata	Needle-and-thread-grass	Occasional
	Poa Nevadensis	Nevada bluegrass	Abundant

* Indicative of past disturbance, increasing in distribution

** Currently listed as a Noxious Weed for Utah

\+ Included as weedy species in summary table

Vegetation Cover Levels Sufficient to Establish Re-vegetation Success Standards:

According to the NRCS Ecological Site Description, vegetation on the mine area is dominated by big sagebrush, Nevada bluegrass, and bluebunch wheatgrass. Other significant components include sagebrush (*Artemisia tridentata*), spiny horsebrush (*Tetradymia canescens*), antelope bitterbrush (*Purshia tridentata*) and broom snakeweed (*Gutierrezia sarothrae*).

Based on the vegetation survey this is reasonably representative, with the shrub component being simplified to sagebrush and snakeweed. Cheatgrass was very common on the north end of the project area, and forbs were more common throughout than suggested in the Ecological Site description. Common forbs included silky crazyweed (*Oxytropis sericea)*, *Astragalus spp.*, Northern sweetvetch (*Hedysarum boreale)*, and popcorn flower (*Cryptantha sp.*). Cheatgrass was scattered throughout the project area in small patches at higher elevations on the south and was a major component on the north end of the project area on alluvial slopes below 5,000 feet.

The average vegetation cover for the 15 quadrats was 57 percent and ranged from 30 percent to 85 percent. Percent cover by life form is listed in Table 8 below. To reach 70 percent of the cover existing before mining, the minimum post-mining vegetation cover for all species will need to be 39.9 percent. Listed by life form, minimum cover for shrubs will be 12.6 percent, grasses will be 17.5 percent, and forbs will be 2.1 percent.

Table 8: Percent Cover by Life Form by Quadrats for Grantsville Mine*

Cover Type	Quadrat Number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Avg.
Shrubs	12	16	36	25	0	5	5	12	72	10	10	5	25	13	31	18
Desirable Forbs	0	1	3	11	1	8	0	3	0	7	6	4	0	3	0	3
Desirable Grasses	12	35	15	30	24	50	35	13	0	35	50	48	5	25	3	25
Total Desirable Vegetation	**24**	**52**	**54**	**66**	**25**	**63**	**40**	**28**	**72**	**52**	**66**	**57**	**30**	**41**	**34**	**47**
Weedy Species	36	2	14	4	5	2	15	2	13	3	12	0	7	25	8	10
TOTAL VEG	*60*	*54*	*68*	*70*	*39*	*65*	*65*	*30*	*85*	*55*	*78*	*57*	*37*	*66*	*42*	*57*

Cover Type	Quadrat Number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Avg.
Litter*	18	10	3	5	10	10	13	15	15	5	10	10	5	29	5	11
Rock	0	20	0	15	54	20	20	40	0	25	2	23	10	0	3	15
Bare Ground	22	16	30	10	6	5	12	15	0	15	10	10	48	5	50	17
TOTAL	100	100	101	100	100	100	100	100	100	100	100	100	100	100	100	100

* Based on data collected May 23, 2007

106.8. Depth to Groundwater, Overburden material, and Geologic Setting

Groundwater

The closest groundwater rights of similar elevation and geology to the mine site are located in Section 33 of T2S, R6W, approximately two miles to the southeast of the project area but in a similar geologic unit. There are several groundwater rights, mostly artesian springs, listed in Sections 16 and 21 of T2S, R6W – approximately one mile from the project area – but these are at a much lower elevation than the mine and are nearer the edge of the outwash plain that is different geologically from the area to be mined (See **Figures 7**).

One well log was located for Water Right No. 15-1464, located in the NW ¼ NW ¼ NE ¼ Section 33, T2S, R6W. It was drilled at a surface elevation of approximately 5,200 ft. Static water depth was 367 ft. below the land surface on June 30, 1967. Static water depth for water Right No. 15-4172, located in the SW ¼ NW ¼ SE ¼ Section 33, T2S, R6W is listed as being approximately 700 ft below land surface. This, in addition to information in Section R467-109.1, indicates that groundwater is not likely to be encountered on the project area during mining, and depth to groundwater is expected to be well below the maximum extent of mining.

Overburden Material

Other than the top six inches of material set aside for the reclamation purposes as topsoil, all other material is sold as various aggregate products. No overburden, reject materials, or waste material are produced.

Geology of the area

The project area is located within the Basin and Range Physiographic Province on the eastern flanks of the Stansbury Mountains in Tooele County, Utah (BLM, 2003), which extend south from Timpie for about 30 miles to Johnson Pass (Utah Highway 199). They are oriented north-south and rise abruptly from the desert floor. To the east lie Tooele Valley and Rush Valley with elevations ranging from 4500 to 5500 feet (GORP, 2007) (See **Figure 8**, Geology).

The region consists of Cambrian through Pennsylvanian quartzites, carbonates, and shales that were deformed during Mesozoic compression and Cenozoic extension. These events created a broad anticline trending N5°E with 30°W and 60°-overturned east dipping limbs; a large thrust fault cutting diagonally across steeply dipping beds on both blocks, striking N12°W-N11°E dipping 45°-55°E with a flat-ramp-flat geometry from south to north, indicating a pre-existing footwall structure. A major syncline and at least two small asymmetrical sub-parallel mapped folds are located on the east side of the range with vertical to strongly overturned dips along the western flank and 30°-45°SW dips along the eastern flank trending N20°W and plunging steeply to the south. Associated with this deformation are a variety of normal faults both within the range and at the range-basin margin. There are abundant fractured rocks throughout the project area (Copfer, 2001).

Deposition of massive sequences of carbonate rocks (such as limestone and dolomites) accumulated in a shallow marine environment to thicknesses of as much as 30,000 feet. These carbonate deposits are exposed in the many mountain ranges, and form a thick wedge, generally thinning eastward (BLM, 2003). By the middle Triassic (225 million years before present) the continental margin began to shift westward. Rocks of middle Triassic to Early Jurassic age in eastern Nevada and western Utah consist largely of sandstone, shale, and freshwater limestone (BLM, 2003).

The Sevier Orogeny was the result of extensive regional compression of the earth's crust, generally along the same belt that formed the ancient continental shelf during Paleozoic. In the middle and late Tertiary (starting around 20 million years ago), tectonic forces reversed, resulting in crustal extension. The entire region underlying the present-day Basin and Range province was pulled apart by tensional forces. Large-scale normal (vertical offset) faulting caused huge blocks to be dropped, tilted, or rotated in response to being pulled apart or thinned. In addition t, nearly vertical strike-slip (lateral offset) faulting also occurred during the middle and late Tertiary times (BLM, 2003).

The overall result was that north-south oriented mountain ranges (horsts) were raised and tilted, and basins (grabens) formed in the intervening depressed areas. Erosion of the mountain ranges and the subsequent deposition of the erosional debris filled the valleys with several hundred to several thousand feet of sediment. This parallel sequence of mountain ranges and intervening basins, interspersed with mountains of volcanic origin, combine to give the region its characteristic basin-range topography (BLM, 2003).

106.9. Location and size of ore and waste stockpiles, tailings and treatment ponds, and discharges

Waste/Overburden Stockpiles

Raw materials consist of rock that has been removed from the hillside. Other than the top six inches of material that is set aside for reclamation purposes as topsoil, all rock material removed from the hillside is used to create aggregate products according to customer specifications. No waste rock is generated.

Material Stockpiles

There are several stockpiles of sorted and sized rock products stored on site. The general, current, and future locations of these stockpiles are shown on **Figure 4.** A list of stockpiles and maximum expected volume of each can be found in **Table 6** below.

Table 6: Stockpiles and Estimated Max. Volumes for the N. Grantsville Mine

Stockpile Material	Maximum Volume	Stockpile Material	Maximum Volume
Road Base (1"dia.)	100,000T	Slurry Sand (Type 2)	5,000T
Fines (0.25" dia.)	50,000 T	Drain Rock	30,000T
Sub-base (3" dia.)	50,000 T	Basket Rock (8" dia.)	10,000 T
Chip Rock (0.5" dia.)	30,000 T	Concrete Rock	50,000T
Chip Rock (0.38" dia.)	50,000T	Asphalt Rock (0.75" dia.)	50,000T
Slurry Sand (Type 1)	5,000T	Landscape Rock	5,000T
Natural Fines (0.25"dia.)	50,000T	Concrete Sand	30,000T

Tailings

No Tailings will be produced at this mine.

Water Storage/Treatment Ponds

Water for dust suppression, crushing and screening will be hauled in from outside the project area. Water will be stored in a tank on site until ready for use. Water used in the crushing, aggregate processing and on roads will be absorbed into the gravel and sand, leaving no excess water for run-off. However, in the unlikely event that run-off from the crusher/screening area occurs, water will be directed to the storm water retention basin.

Any storm water run-off coming from affected lands will be collected in the storm water retention basin or within the quarry confines, which, at a minimum, will be sized for the 10-year, 6-hour event, and will be located at the northeast (lowest) corner of the property, just south of the access road (county road). This retention pond is discussed in more detail in 109.4.

Discharges

Currently any water used for dust control or concrete batching will be hauled in from off site sources. Installation of the batch plant is not anticipated any sooner than 2015. All water used in making concrete is held in the concrete slurry and sold as part of the ready-mix product. All water used for cleaning out cement trucks is recycled.

R647-4-107. Operation Practices

As required, the relevant Operation Practices stipulated in R647-4-107 will be followed.

R647-4-108. Hole Plugging Requirements

There are no plans for future drilling within the permit area for exploration. If drilling for any reason other than blast hole drilling is planned in the area, Geneva will notify DOGM and the following procedures will be employed.

- Drill holes shall be properly plugged as soon as practical and shall not be left unplugged for more than 30 days without approval by DOGM.
- Dry holes and non-artesian holes that do not produce significant amounts of water may be temporarily plugged with a surface cap to enable Geneva to re-enter the hole for the duration of set operations.
- Surface plugging of drill holes outside the mine area shall be accomplished by setting a nonmetallic permaplug at a minimum of five (5) feet below the surface, or returning the cuttings to the hole and tamping the returned cuttings to within five (5) feet of ground level. The hole above the permaplug or cuttings will be filled with a cement plug. If cemented casing is to be left in place, a concrete surface plug may not be required is a permanent cap is secured on top of the casing.
- Drill holes that encounter water, oil, gas or other potential migratory substances and are 2.5 inches or greater in surface diameter will be plugged in the subsurface to prevent the migration of fluid from one stratum to another. If water is encountered, plugging shall be accomplished as outlined below.
- If artesian flow (i.e. water flowing to the surface from the hole) is encountered during or upon cessation of drilling, a cement plug will be placed to prevent water from flowing between geologic formations and at the surface. The cement mix will consist of API Class A or H cement, with additives as needed, and will weigh at least 13.5 lbs./gal. It will be placed under the supervision of a person qualified in proper drill hole cementing or artesian flow.

- Artesian bore holes will be plugged as described prior to removal of drilling equipment from the well site.
- If the surface owner of the land affected desire to convert an artesian drill hole into a producing and/or monitor well, the landowner will provide written notification to DOGM accepting responsibility for the ultimate plugging of the drill hole.
- Holes that encounter significant amounts of non-artesian water shall be plugged by: 1) placing a 50-ft cement plug immediately above and below the aquifer(s) or filling from the bottom up (through the drill casing) with a high grade bentonite/water slurry mixture. The slurry shall have a Marsh Funnel viscosity of at least 50 seconds per quart prior to the adding of any cuttings.

R647-4-109. Impact Statement

109.1. Surface and ground water systems

Surface Water

The Geneva N.Grantsville Mine is located on a small sub-ridge located east of the main spine of the Stansbury Mountains. Excavation will first cut into alluvial gravels that partially bury this sub-ridge, but will quickly reach the steeply-dipping limestone bedrock itself. A 100-acre ephemeral, first order watershed cuts through the northwest corner of the mine area in these alluvial deposits, and cuts a 2-3 foot deep, partially vegetated channel. The wash loses its channel to the northeast of the mine as it loses gradient on the lower, flatter outwash plane that is the dominant geologic feature to the east of the Stansbury Mountains.

Because mining will cause most of the water flowing from this watershed to flow into the mine area, watershed runoff modeling using standard Curve Number methodology was used to estimate the runoff volume from this ephemeral watershed. Modeling assuming the 10-year, 6-hour precipitation event (with a depth of 1.25 inches), as derived from the NOAA Atlas 2 (National Weather Service 2007). The resultant estimated runoff volume and supporting information are shown in **Table 9** below.

Table 9: Runoff Rate and Volume Estimates for the 10-year, 6-hour Storm Event

Location	Watershed Area (Acres)	Time of Concentration (hrs)	Watershed Curve Number	Peak Discharge (cfs)	Estimated Runoff Volume (Ac-Ft)
Drainage A	100	0.13	62	0.02	0.001

As the quarry develops to the south the negative 1% slope will increase the water holding capacity of the quarry, developing far more capacity than is needed for storm water retention.

There are no identified springs or wells within the Grantsville mine project area. The only water rights in Section 17, 18, 19 or 20 of T2S, R6W listed on the State Engineer's database (http://utstnrwrt6.waterrights.utah.gove.cgi-bin/mapserv.exe), are four surface water rights Geneva owns that are located on ephemeral drainages that are about ½ to ¾ mile southwest of the mine area. These springs are located over a deeper strata of bedrock than the mine area and thus are unrelated hydrologically to the mine area. Their presence provides no indication of groundwater conditions below the mine site itself. These water rights do, however, provide Geneva with 1,000 stock units of water (28.1 acre feet) per year that will continue to be maintained for livestock watering on the property.

The closest groundwater rights that will provide reasonable information about depth to groundwater at the mine site are located in Section 33 of T2S, R6W. These are at a similar elevation and geology as the central portion of the mine. Based on information provided in Section 106.8, no impacts to groundwater are anticipated.

All fuel, oil, and solvents will be stored in approved tanks in lined retention areas located within the process facilities area to prevent pollution to stormwater run-off. In addition, a sediment pond sized for the 10-year, 6-hour event will be constructed to contain any sediment or pollution laden waters generated by the mine. These protective measures are discussed more thoroughly in the Stormwater Management Plan, contained in Appendix H.

Ground water

No ground water is expected to be encountered during future mining activities.

The major activities on the mine property that could impact groundwater if residues were to reach this resource are: 1) blasting (will occur up to 50 times per year); 2) presence of diesel fuel, lubricants, etc. used in the heavy equipment used at the mine, 2) presence of additives used in the concrete batch plant, and 4) human wastes, which are processed through chemical toilets, which are serviced regularly. In summary:

- Good housekeeping practices and careful operating procedures are used to minimize fuel and lubricant spills. Fuel and lubricants are stored in tanks that have secondary containment that protect against spills.
- Crushing equipment and vehicles are regularly maintained to prevent lubricant leaks and other malfunctions.
- The quantities of blasting materials used create negligible quantities of nitrates that, in the unlikely event that they reached the groundwater, would be well below water quality limits.

109.2. Wildlife habitat and endangered species

The project area ranges from 4,800 feet elevation at the northeast corner to 5,600 feet elevation at the southwest corner. The mine area will excavate into a minor ridge on the northeast side of Little Mountain, which is on the lower, east-facing flanks of the Stansbury Mountains.

Maps in the Utah Conservation Database (UCD), located at http://dwrcdc.nr.utah.gov/ucdc/ , indicate that the project area does not contain any significant habitat for mule deer, elk, moose, or pronghorn. However, deer do utilize lands further up into the foothills of the Stansbury Mountains.

The UCD website lists four animal species listed as Utah Species of Concern that may be present in Tooele County in the land form/habitat type located at Geneva's Grantsville Mine. These species are listed below in Table 10, below.

The Utah Natural Heritage Program of the Division of Wildlife Resources was contacted for information about these species of particular concern. Their response letter, attached in the correspondence section (Appendix B), did not list any known records of these species of concern on or within one mile of the project area.

Table 10: Threatened, Endangered, and Candidate Species of Tooele County that could be present in the project area*

Common Name	Scientific Name	Status	Habitat Preferences	Utah GAP Analysis Predicted Habitat west of Grantsville, Tooele County.
Kit fox	*Vulpes macrotis*	SPC^	Open prairie, plains and desert	Substantial value habitat
Ferruginous hawk	*Buteo regalis*	SPC	Flat to rolling terrain in grassland or shrub steppe, often at periphery of Pinyon-Juniper woodlands	Primary breeding habitat
Pygmy rabbit	*Brachylagus idahoensis*	SPC	Areas with tall, dense sagebrush and loose soils	High value habitat
Short-eared owl	*Asio flammeus*	SPC	Grasslands, shrublands, and other open habitats	Primary breeding and wintering habitat

* Information collected July 27, 2007 at http://dwrcdc.nr.utah.gov/ucdc/
^ SPC = Species of special concern.

Based on the information presented in the database it is possible that the kit fox could use the area intermittently and the Ferruginous hawk may use cliffs, ridges, and pinyon-juniper areas of Little Mountain or the slopes of the Stansbury Mountains for nesting. The Pygmy rabbit and Short-eared owl could be found on the mine area, although the

area is dissected and sloping with short sight distance, making the area less desirable for these species.

The site was surveyed for Threatened and Endangered (T&E) Species on Sept. 22, 2009 by Ron Kass, Ph.D., Botanist and Professional Wetland Scientist and he determined that there were no T&E plant or animal species on the site (see letter in Appendix D).

109.3 Existing Soil and Plant Resources

After 10 years of mining, approximately 76,633 CY of soil will be stored from the mining operation for reclamation as shown in **Figure 4**. A total volume of approximately 434,793 CY of soil will be available for reclamation once the mine is fully developed.

All topsoil piles will be a maximum of 10 feet high and have 1.5H:1V slopes and a flat to slightly arched top. A 1-foot high X 3-foot wide berm with interior ditch will be constructed around each topsoil stockpile area using material bucked up from the land surface where the topsoil pile is located. The ditch will catch and retain any soil that sloughs off the stockpile, and the berm will prevent contamination and erosion from storm water.

Three topsoil stockpiles will be constructed in the mining area during years 1-10 covering an area of about 5 acres. Two of the stockpiles will be located along the eastern boundary on either side of the quarry entrance. The other stockpile will be located along the western boundary at an elevation of about 4875.

Substitute topsoil material may be developed to augment the topsoil resources available. This substitute material would include a mix of natural or crushed fines, small rock, and pit run material; imported manure and/or organic matter (i.e. agricultural field refuse, wood chips, bran or wheat chaff); and fertilizer to enhance fiber breakdown. This material would be stored and spread separately from actual topsoil resources.

The newly stockpiled soil will be seeded in the fall of each year it has been enlarged with a quick-growing cover of grass and legumes in order to minimize erosion. This seed mix, listed in Table 8, will be broadcast at a rate of 14.5 lbs./acre PLS (pure live seed).

Table 8: Seed Mix for Topsoil Stockpiles

Seed Species		PLS* Pounds Per Acre
Scientific Name	Common Name	
Elytrigia intermedia	Intermediate Wheatgrass	2.5
Psuedoroegneria spicata	Bluebunch Wheatgrass	2.5
Achantherum hymenoides	Indian Rice Grass	2.00
Elymus elymoides	Bottlebrush Squirreltail	1.50
Poa sandbergii	Sandberg Bluegrass	1.50
Medicago sativa	Alfalfa	0.75
Agropyron cristatum	Crested Wheatgrass	2.5
Hedysarum boreale	Northern sweetvetch	1.25
	Total	**14.50**
*PLS = pure live seed		

The size of the area stripped in front of the mining and storage areas will be minimized to limit dust generation and the establishment of noxious weeds. At the same time, the stripped area will be large enough to allow equipment to operate on the stripped lands, and contain within the stripped area all fly-rock that could occur from blasting. Please see subsections 106.5 and 106.6 for more information about topsoil.

All areas disturbed by Geneva (the bonded area) will be reclaimed at the end of mining by regarding (ripping compacted surfaces where necessary), topsoiling, and re-seeding as described in Section 110, with the goal of creating a self-renewing, perennial vegetation cover similar to native conditions.

109.4. Slope stability, Erosion Control, Air Quality, Public Health and Safety

Slope Stability

The rock at the N. Grantsville Quarry is massive limestone rock of Mississippian age. During mining, all active high walls will be maintained at 40-foot high walls set back on a 15 foot batter with 25 foot benches. The overall slope of these benched high walls will be 1H:1V. The thin layer of unconsolidated alluvium on top of the lithic formation will be sloped at a 2H:1V along the mine perimeter. Geneva inspects all high walls two times per month. A more extensive high wall inspection is conducted yearly with the MSHA inspector. A factor of safety of 1.25 or greater will be maintained at all times on slope stability. If problems occur with the planned 1H:1V slope, a geologic study will be performed to determine a safe slope configuration.

Please refer to R647-4-110.2, Reclamation Plan – High walls, for further information on slope stability during reclamation.

Erosion Control

Due to the arid nature of the landscape, very little run-off is expected from ephemeral drains or overland flow in or near the mine area. If erosion or sedimentation is likely on down-slope, native lands to the east, west, or north of the disturbed mine area, rock check dams or berms will be erected at the edge of disturbance to keep sediments from draining onto these areas. If overland flow originating from native lands up-slope of the mine (to the south occurs), this water will be diverted around the affected area by the MSHA-required safety berms constructed along the highwall. Any erosion or sediment produced on mine-affected lands will be contained within the quarry.

The quarry floor will eventually have a one percent slope to the south (toward the quarry face). This negative slope will cause all stormwater entering the quarry to remain there until evaporated or absorbed into the ground. Until the quarry face gets fully developed, a sediment pond sized for the 10-year, 6-hour event (1.25 inches) will be constructed to catch stormwater and/or mining-related sediments generated at the beginning of mining activity. All water that collects in the quarry at the start of phase 1 will be held in this pond, constructed at the northeast corner of disturbance. The pond is designed to hold approximately 152 % of this event, and will initially be constructed to hold 15 acre feet or 4,875,000 gallons (See Table 11 below). This pond will be approximately 3 acres in surface area, with an average depth of 5 feet.

Table 11: Required Sediment Pond Capacity Based on Disturbance Area

Quarry size	25 Acres	30 Acres	40 Acres	50 Acres	75 Acres	95 Acres
10-yr, 6-hr event	1.25	1.25	1.25	1.25	1.25	1.25
Required Capacity in Acre Feet	2.60	3.13	4.17	5.21	7.81	9.9
Required Acreage of Pond at 5 ft. average depth	0.52	0.63	0.83	1.04	1.56	1.98

Erosion of dirt and dust from on roads will be controlled by graveling the road, and grading it to have sufficient crown and drainage ditches to the side so that water does not pond. Sufficient turn-outs from road ditches will be provided to allow water collecting on the road to be released to native lands in a non-erosive manner. Erosion protection for soil stockpiles is addressed under **Soils**, above.

Erosion will be minimized on reclaimed lands by conducting reclamation activities on the contour, with the use of benches and berms on highwalls, and by seeding at the first appropriate time after topsoil spreading.

Air Quality

Initially, Geneva will operate crushers and plants with Temporary Relocation Permits obtained from the State of Utah, Division of Air Quality obtained on an as needed temporary basis. As business increases, permanent site permits will be secured.

Public Health and Safety

Geneva Rock Products will minimize the hazards for public safety and welfare during operations. These measures include:

- No mining shafts or tunnels exist on the site. All buildings, silos, conveyors, and other facilities and equipment are signed to discourage unauthorized or accidental entry in accordance with MSHA regulations.
- A gate at the single access road on the east side of the quarry will be locked when the site is not operating. The perimeter of the permit area will be fenced to prevent unauthorized entry into the permit area during both operating and non-operating hours.
- Trash, scrap metal and wood, and extraneous debris is disposed of in marked containers that are picked up monthly and disposed of at the Tooele County Landfill.
- Although none are planned, any exploratory or other drill holes will be plugged and/or capping of as set forth in Rule R647-4-108.
- Appropriate warning signs will be located at public access points, and every 300 feet along the east boundary.
- All deleterious or potentially deleterious material, such as fuel tanks and supplies of lubricants and oils, are kept in one bermed storage area to minimize and control adverse environmental effects.
- Used lubricating and hydraulic oils are collected in designated tanks and drums and Held for collection by used oil distributors who process it into burner fuels.

R647-4-110. Reclamation Plan

110.1. Current Land Use and Post-Mining Land Use

The current land use of the Grantsville Mine is rangeland and wildlife habitat. The future use will be rangeland and wildlife habitat. The area is currently zoned MP-EX by Tooele County. This zoning allows agriculture, asphalt plants, and manufacturing facilities for

coal, gasoline, iron, lime, oil, tar, precious or semi-precious stones/metal, and ore smelting. This site borders an existing MG-EX zone to the south and east and is surrounded by existing mine sites and open space on land that is privately owned or owned by the U.S. government.

A Conditional Use Permit (CUP) is in process with Tooele County.

One pre-existing road provides access to the mine site. It is upgraded as far as the mine entrance, and will be upgraded over time as far as the southwest corner of the quarry to allow access to active mine benches, as described in 106.2. The road will be left as an improved county road upon completion of mining.

110.2. Reclamation of Roads, High walls, Slopes, Leach Pads, Dumps, Etc.

Roads

Upon completion of mining, the main access road that follows the pre-existing two-track (2.4 acres) will be graded back to a two-track road, and drill seeded as described in Reclamation of benches and quarry floor below.

Highwalls

As mining progresses southward, sidewalls will be graded to an overall slope of 1H:1V to reach their final configuration, with 40 foot high walls laid back 15 feet, and 25-foot wide benches in between. All high walls will also be left at this configuration. If mining ceases before the full extent of the quarry is developed, all exposed working faces will be reclaimed to the 40/15/25 configuration noted above.

Slopes & Quarry Floor

Bench surfaces, which become fractured due to blasting and ripping during mining, will create a somewhat friable, rough surface that will hold topsoil and seeds in place. Benches will be 25 feet wide. Highwall berms will be left along those portions of the highwall and sidewall rim that are over five feet high .

Once mining is completed on the quarry floor, any remnants of material stockpiles will be graded across the quarry floor as described in "Disposition of any stockpiles remaining", above. The quarry floor will be graded as necessary using self-loading scrapers and a road grader to create a slightly rolling surface (bond calculations assume an average of six inches of material moved per acre). The floor will then be

ripped to a depth of 18" to relieve compaction and encourage root penetration prior to topsoiling. Ripping the quarry floor will create a rough surface to lay topsoil upon. This will help prevent soil erosion and will aid in revegetation efforts by creating small depressions to catch and hold rain and snowmelt and provide wind protection for seeds.

Topsoiling and seeding of benches and the quarry floor is discussed under 110.5 below.

Impoundments, Pits and Ponds to be Left

Water control structures such as ditches and water turn-outs associated with the Little Mountain Road access road will be left in place for future use. Road reclamation is explained under Roads, above.

The sediment sump/stormwater retention basin at the northeast end of the mining area built to collect runoff from the stockpile and processing area will be backfilled and graded to blend with surroundings. This work will be the last area reclaimed to minimize the chance for off-site sediment. The area will be prepared and seeded as part of the quarry floor as noted above.

A five acre area in the lowest point of the quarry will not be covered with topsoil and will be drilled and shot 20' deep to "fluff" the bedrock to create a sump that will facilitate percolation of accumulated storm water into the quarry substrates.

Drainages

Any drainages flowing over the high-walls into the quarry depression will be lined with 8" x 24' rock to prevent erosion.

Dumps, Shafts, Adits and Leach Pads

No waste material will be generated, therefore no reclamation of dumps will need to be completed.

There are no shafts, adits or leach pads on the property and none will be constructed.

Drill Holes

If drilling occurs, holes will be properly plugged and sealed as required in Section R647-4-108.

110.3. Surface Facilities to be left

The access road will not be reclaimed after completion of mining. The surety bond does not include the cost of access road reclamation.

No structures will be left. All facilities will be reclaimed. Approximately 1.6 acres of two-track roads will be maintained in reclamation to allow access and monitoring of the reclaimed mine.

A list of structures to be reclaimed is included in the Demolition section of the Surety Calculations located in Appendix F.

All facilities will be demolished after salvaging metals and removing insulation, tile, etc. Concrete will be broken up and buried on site. Other materials will be hauled to a licensed landfill and disposed.

110.4. Treatment, location, and Disposition of Deleterious Material

Potentially hazardous insulation, tile, and non-salvageable debris from demolition will be removed to a licensed landfill. All tanks will either be removed to a licensed landfill upon reclamation or sold. The surety calculations contained in Section 113 assume these items are disposed of at the Tooele County Landfill located south of Tooele on the Bouer Road.

All conveyors, crushers, screens, concrete plant, asphalt plant and other equipment used for mining and processing of aggregate will be removed upon reclamation or sold. The surety calculations contained in Section 113 assume these items are disposed of at the Western Metals Recycling Center in Salt Lake City.

110.5. Re-vegetation Planting Program and Topsoil Re-distribution

After final shaping and grading of the quarry floor, concrete batch plant area, slopes, and roads within the disturbed area, surfaces will be ripped and/or scarified on the contour to relieve compaction.

Soil Material Replacement

Topsoil and topsoil substitute material (described under Sub-section 109.3) will be spread on the quarry floor and plant areas using self loading scrapers to place soil, and a grader to spread soil. Topsoil will be spread to a depth of six inches. Marked lath will be used to guide dozer operators to the correct topsoil depth. Topsoil will be placed 6" deep on high wall benches where possible. The steep slopes between the benches will not be covered with topsoil or reseeded.

Seed Bed Preparation

Prior to spreading any topsoil or topdressing, stockpiles will be tested for organic matter, Nitrogen, Phosphorus, and Potassium. If these levels are low, composted manure will be applied to the solid or topsoil substitute after it is spread.

Topsoil will be laid down with a scraper, and if needed, composted manure at 10 ton/acre will be spread. All surfaces will be scarified along the contour with a road grader to assure mixing of the soil and manure to create consistent-textured soil and a roughened surface that will hold the seed and moisture for best germination.

Seed Mixture

Table 10 below provides the seed mixture that will be used in reclamation on all bonded, disturbed areas at N. Grantsville Quarry that are 3:1 or flatter, including highwall benches. Drill and broadcast seeding rates would be the same.

Table 10: Reclamation Seed Mix for N. Grantsville Quarry

Common Name	Scientific Name	PLS Pounds/Acre
'Hycrest'Crested Wheatgrass	*Agropyron cristatum'Hycrest'*	0.4
Intermediate wheatgrass	*Agropyron intermedium*	1.5
Western Wheatgrass	*Agropyron intermedium*	1.5
Indian ricegrass	*Oryzopsis hymneoides*	1.2
Ladac Alfalfa	*Medicago sativa*	0.8
Yellow sweetclover	*Melilotus officinalis*	0.4
Palmer penstemon	*penstemon palmeri*	0.4
Small burnet	*Sanguisorba minor*	0.8
Mtn Big Sage	*Artemesia Tridentata vaseyana*	0.1
Globe mallow	*Sphaeralcea coccinea*	0.4
Rubber rabbitbrush	*Chrysothamnus nauseosus*	0.4
Forage kochia	*Kochia prostrata*	0.4

	Total Rate to be Seeded	**8.3**

Seeding Method

All disturbed areas excepting the sump and steep slopes between benches will be seeded using a range-type drill seeder.

Fertilization

Prior to spreading any topsoil or topdressing, stockpiles will be tested for organic matter, Nitrogen, Phosphorus, and Potassium. If these levels are low, 10 tons of composted manure per acre will be applied to the soil or topsoil substitute after it is spread. Soil amendment quantities will be approved by DOGM prior to application.

Other Re-vegetation Procedures

None.

R647-4-112 Variance

No variances are proposed with this application.

R647-4-113 Surety

The reclamation surety calculations are contained in Appendix F. A summary of the estimated costs of reclamation for phase I is included below.

1.	Demolition and removal of structures	$347,307.00
2.	Backfilling, grading, and contouring	$320,843.00
3.	Revegetation (preparation, seeding, mulching)	$105,150.00
4.	Mob/Demob	$77,315.00
5.	Contingency	$38,658.00
6.	Engineering Redesign	$19,329.00
7.	Main office Expense	$52,574.00
8.	Project Management Fee	$19,329.00
9.	Subtotal Indirect Costs	$207,205.00
10.	Escalation	$23,103.00
11.	Reclamation Costs Escalated	$1,003,458.00

12. Bond Amount for 95 acre disturbance (rounded to nearest $1,000)$1,003,000.00

References

Natural Resources Conservation Service (NRCS 2008) Web Soil Survey: Eastern Box Elder County Area, Utah. Available online at: http://websoilsurvey.nrcs.usda.gov/ Accessed Oct. 2008.

Utah Conservation Data Center, 2007. Sensitive Species List by County. Available online at: Http://dwrcds.nr.utah.gov/ucdc/ViewReports/sscounty.htm Accessed Oct. 2008.

Utah Division of Water Rights, 2007. Water Right Record Information. Available online at: http://www.waterrights.utah.gov/wrinfo/query.asp Accessed October 2008

Appendix A
Photos of Area

TOPSOIL SAMPLE #1

TOPSOIL SAMPLE #2

Drawn: B. SUMSION	N. GRANTSVILLE QUARRY TOPSOIL SAMPLE PITS						Geneva Rock Products, Inc. N. Grantsville Quarry DOGM Permit Application	Geneva Rock Products, Inc. 1565 West 400 North Orem, Utah 84057
Checked:								
Approved:								
Date: Sept. 3, 2009	TP 1 & 2 SAMPLES	Dwg. No.:						
Dwg. No.:			No.	Date:	Description:	By:		

TOPSOIL SAMPLE #3

TOPSOIL SAMPLE #4

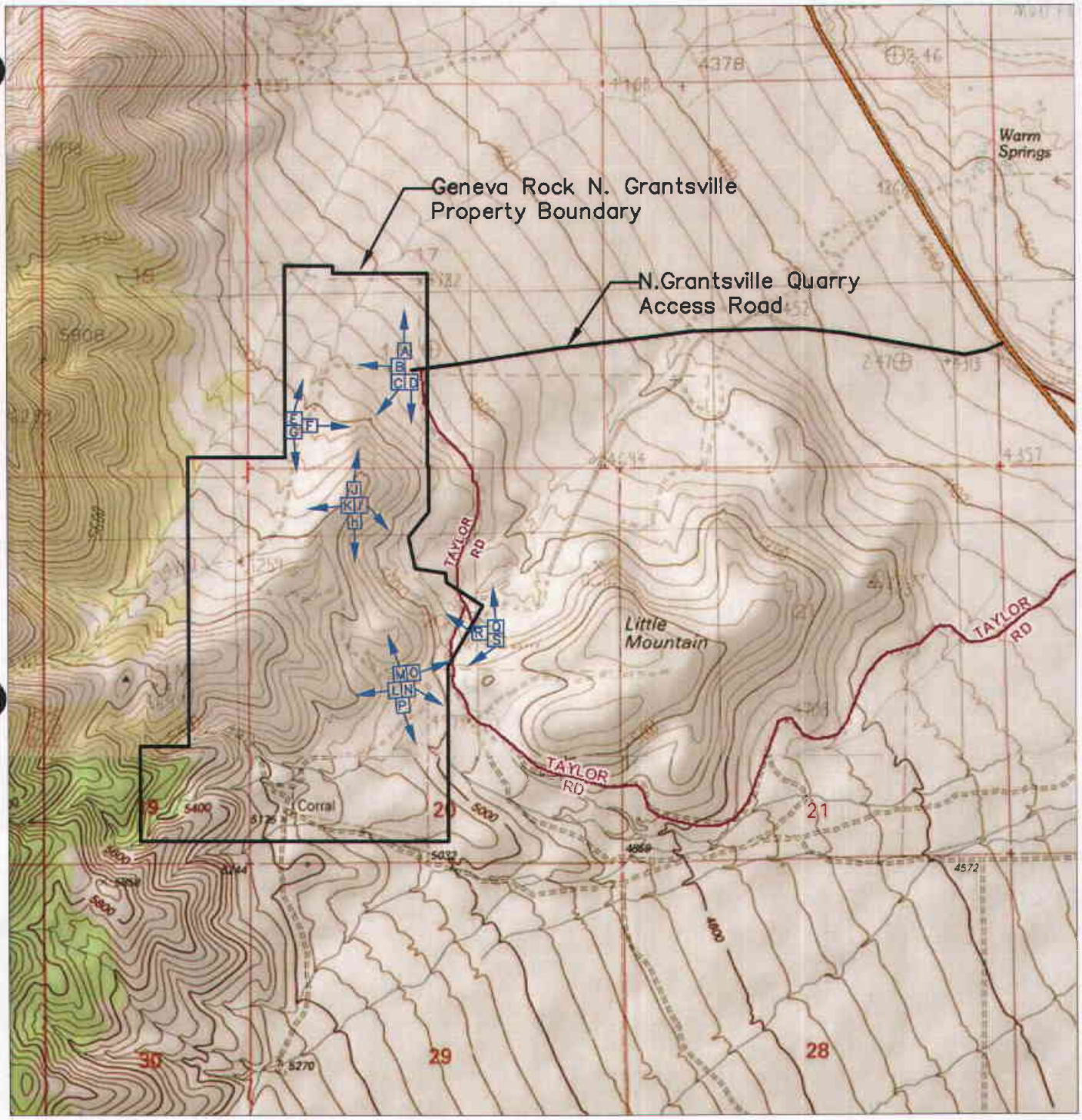
[illegible]B. SUMSION	N. GRANTSVILLE QUARRY TOPSOIL SAMPLE PITS						Geneva Rock Products, Inc. N. Grantsville Quarry DOGM Permit Application	Geneva Rock Products, Inc. 1565 West 400 North Orem, Utah 84057
[illegible]cked:								
Approved:								
Date: Sept.3, 2009	TP 3 &4 SAMPLES	Dwg. No.:						
Dwg. No.:			No.	Date:	Description:	By:		

TOPSOIL SAMPLE #5

TOPSOIL SAMPLE #6

[illegible]. SUMSION	N. GRANTSVILLE QUARRY TOPSOIL SAMPLE PITS						Geneva Rock Products, Inc. N. Grantsville Quarry DOGM Permit Application	Geneva Rock Products, Inc. 1565 West 400 North Orem, Utah 84057
[illegible]ked:								
Approved:								
Date: Sept. 3, 2009	TP 5 & 6 SAMPLES	Dwg. No.:						
Dwg. No.:			No.	Date:	Description:	By:		

N. GRANTSVILLE PHOTO SCHEMATIC



Please note the following regarding the attached photos:

- All photos taken Sept 3, 2009.
- Photo orientation is noted in parenthesis.
- General photo location and orientation are shown on the schematic above.
- The picture lettering coincides with the shcematic lettering above.

N

Drawn: [redacted]. SUMSION	N. GRANTSVILLE QUARRY PHOTO SCHEMATIC						Geneva Rock Products, Inc. N. Grantsville Quarry Project DOGM Permit Application	Geneva Rock Products, Inc. 1565 West 400 North Orem, Utah 84057
Approved:								
Date: SEPT. 3, 2009	1" = 2000'	Dwg. No.:						
Dwg. No.:			No.	Date:	Description:	By:		

Photo A (looking North)

Photo B (looking West)

Photo C (Looking South West)

Photo D (looking South)

Photo E (looking North)

Photo F (looking East)

Photo G (looking South)

Photo H (looking South)

Photo I (looking Southeast)

Photo J (looking North)

Photo K (looking West)

Photo L (looking West)

Photo M (looking North)

Photo N (looking Southeast)

Photo O (looking Northeast)

Photo P (looking Southeast)

Photo Q (looking North)

Photo R (looking Northwest)

Photo 5 (looking Southwest)

Appendix B
Vegetation Study

Geneva Rock Products
Proposed Grantsville Quarry
Spring 2007 Vegetation Survey Report

This report has been prepared to support the Notice of Intent (NOI) to commence large mining activities submitted for review to the Utah Division of Oil, Gas and Mining (DOGM) by Geneva Rock Products, Inc. (Geneva).

Background

The proposed Geneva Grantsville quarry is located approximately 4.5 miles northwest of Grantsville. The proposed pit would be about two miles west of State Highway 138, and is accessed via a poorly maintained county road, Taylor Road. The pit would be located in portions of Sections 17, 18, 19, and 20, Township 2S Range 6W.

Under the Utah regulations for large mining operations, R647-4-106.7, the operations plan in the NOI must provide a description of existing vegetative communities and cover levels, sufficient to establish revegetation success standards at 70% of pre-mining vegetative cover.

Project Area/ Site Description

The Project Area for this vegetation survey was a sagebrush-bunchgrass community (see Figures 1 and 6 in NOI Application). The southern reach of the survey included an area with juniper as a significant species, however, sagebrush and grasses remained the dominant plant species. The upper and mid elevations of the project area (5,400 ft. – 5,160 ft.) were in good range condition, with a variety of ages of sagebrush and a variety of perennial grasses growing. Cheatgrass had infiltrated the lower elevations below about 5,160 feet to become the dominant grass. There were cows and calves grazing on the project area and some plants in the quadrats had been grazed. Forage utilization for the area was below 15%.

The vegetation survey included survey points located between and 4,960 and 5,520 feet elevation on hilltops and hillsides within the area noted on Figure 6 in the NOI Application. The proposed quarry area includes north, west, east, a few south facing slopes; and hill top/rock outcrop areas.

The properties are located on a the east flank of the Stansbury Mountains. The rocks, a variety of limestones and quartzites, dip steeply to the east. There are several other gravel pits mining the same formations to the north of this proposed project area.

The Tooele Web Soil Survey (NRCS 2007) lists the property as being within the Upland Gravelly Loam (Mountain Sagebrush) and the Mountain Shallow Loam (Low Sagebrush)
ecological sites. The soils are very cobbly over the entire quarry area. Due to the limestone parent material, the soils have high Calcium carbonate levels and are clayey.

Sodium levels are low. The pH is alkaline and ranges from 7.9 to 9.0.The suitability of these soils for rangeland seeding is poor to very poor, limited by slope, cobbles, and restricted rooting depth.

Methodology

Fifteen one-meter-square quadrats were randomly located within the project area by selecting five easily field-identifiable "base point" locations to assure reasonable spread of the quadrat locations (see **Figure 6** in NOI for base point and quadrat). No GPS was used for this survey. From these base points, two to four quadrat locations were located by using random numbers between 1 and 250 to denote the number of steps to take to the quadrat location. A spin of a pen set the direction of travel to the quadrat location. A species list was generated that lists all species observed while walking the project area, as well as those present in the quadrats. The field survey was conducted May 23, 2007 by Marit Sawyer, JBR biologist. Due to the absence of large overstory shrubs of any kind, the ground cover categories (rock, bare ground, litter) and vegetation cover totaled approximately 100 percent for each plot. Any plant species not positively identified in the field was collected and identified by Ms Sawyer to genus.

Results

Existing Vegetation Communities

The Project Area is comprised of an upland, mixed desert shrub overstory up to 1 m high, with native and introduced grasses and forbs making up the understory vegetation community. In order of decreasing abundance, the most common shrubs occurring included: Big Sagebrush (*Artemisia tridentata*), and Broom snakeweed *(Gutierrezia sarothrae).*

The most common perennial grass species were bluebunch wheatgrass (*Pseudogoregneria spicata*) and Sandberg bluegrass (*Poa sandbergii*). Cheatgrass (*Bromus tectorum*) was common in patches at higher elevations and throughout the understory below 5,160 ft. Cheatgrass occurred in all fifteen sampled plots. Needle-and-thread grass was found on sandier areas in the valley on the western half of the project area just above 5,160 ft, elevation.

The herbaceous or wildflower upland community was well-represented and included numerous occurrences of Brodiaea (*Brodiaea douglasii*) (similar to purple onion), many Sego lilies (*Calchortus nutalii*), Utah astragalus (*Astragalus utahensis)* and one other small-leaved *Astragalus* that was not keyed to species, Rollins cryptantha or popcorn flower (*Cryptantha rollinsii*) and several Death camas (*Zygadenus venosus*) plants.

The following table (Table 1) provides a summary of life forms and non-vegetative cover measured during the field survey. The category listed as weedy species consists of undesirable forb and grass species as determined by *Weeds of the West* (Whitson, 1991); it includes both noxious weeds and typical invader species. Shrubs designated by Whitson (1991) as weeds are not included in the weedy species category in the following table. Litter includes moss, which provided significant cover in some areas. A list that includes all vegetation species documented during the summer survey, by scientific name, common name, and an estimate of relative abundance (Table 2) is provided after Table 1.

TABLE 1: Data Summary Table
Spring 2007 Vegetation Survey
Geneva Rock Products Grantsville Property

Cover Type	Stand															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Avg.
Shrubs	12	16	36	25	0	5	5	12	72	10	10	5	25	13	31	18
Desirable Forbs	0	1	3	11	1	8	0	3	0	7	6	4	0	3	0	3
Desirable Grasses	12	35	15	30	24	50	35	13	0	35	50	48	5	25	3	25
Total Desirable Vegetation	**24**	**52**	**54**	**66**	**25**	**63**	**40**	**28**	**72**	**52**	**66**	**57**	**30**	**41**	**34**	**47**
Weedy Species	36	2	14	4	5	2	15	2	13	3	12	0	7	25	8	10
Litter*	18	10	3	5	10	10	13	15	15	5	10	10	5	29	5	11
Rock	0	20	0	15	54	20	20	40	0	25	2	23	10	0	3	15
Bare Ground	22	16	30	10	6	5	12	15	0	15	10	10	48	5	50	17
Total	100	100	101	100	100	100	100	100	100	100	100	100	100	100	100	100

* Litter includes Moss

TABLE 2: Species List: All species observed:

The list below shows all species observed. Abundance was ranked in declining order of prevalence as: Abundant, Common, Uncommon, Locally Common, Occasional, and Rare. Abundance was determined by ocular estimate while data was collected, with adjustments to those ratings made the day afterward based on the entire day's observations and quantitative data collected.

	Scientific Name	Common Name	Relative Abundance
Shrubs, Trees and Sub-trees			
	Artemisia tridentata	Big sagebrush	Abundant
	Chrysothamnus nauseosus	Rubber rabbitbrush	Rare
	Grayia spinosa	Spiny hopsage	Rare
	Gutierrezia sarothrae	Broom snakeweed	Common
	Juniperus scopulorum	Rocky Mt juniper	Locally common
	Tetradymia canescens	Spiny horsebrush	Uncommon
Forbs			
*	*Ambrosia tomentosa*	Ragweed	
	Antennaria sp	Pussytoes	Common
	Astragalus utahensis	Utah milkvetch	Uncommon
	Astragalus sp.	Vetch or locoweed	
	Brodiaea douglasii	Brodiaea	Uncommon
	Calochortus nutalli	Sego lily	Common
	Castilleja sp.	Desert paintbrush	Common
	Crepis accuminata	Mountain hawksbeard	Uncommon
	Cryptantha rollinsii	Rollins cryptantha	Common
+	*Cirsium undulatum*	Thistle	Locally abundant
+*	*Erodium cicutarium*	Storksbill	Abundant
	Eriogonum (ovalifolium?).	Sulfur flower	Uncommon
	Hedysarum boreale	Northern sweetvetch	Occasional
	Onopardum acanthium	White evening primrose	Occasional
+*	*Tragopogon dubius*	Salsify	Common
Grasses			
	Achnatherum hymenoides	Indian ricegrass	Rare
	Agropyron cristatum	Crested wheatgrass	Uncommon
	Agropyron spicatum	Bluebunch wheatgrass	Occasional
+	*Bromus tectorum*	Cheatgrass	Abundant
+	*Elymus elymoides*	Squirreltail	Common
+*	*Poa bulbosa*	Bulbous bluegrass	Rare
	Stipa comata	Needle+thread	Occasional

* Indicative of past disturbance, increasing in distribution
** Currently listed as a Noxious Weed for Utah
\+ Included as weedy species in summary table

Taxonomic References

Craighead, John J., F.C. Craighead, R.J. Davis. 1963. A field Guide to Rocky Mountain Wildflowers. Houghton Mifflin Company, Boston.

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Merrit, Joel et al., 2000. Noxious Weeds Field Guide for Utah. Utah State University.

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Shaw, Richard J. 1989. Vascular Plants of Northern Utah. Utah State University Press.

Taylor, Ronald J.1992. Sagebrush Country: A Wildflower Sanctuary. Mountain Press Publishing Company, Missoula MT.

Welsh, S.L. et. Al. 1987. A Utah Flora. Brigham Young University.

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Vegetation Survey Forms

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 1 Date: 05/23/07

Location: 24 steps S of Base Point 1. 5° slope, N facing, just N of saddle Observers: MS

Shrubs	Percent
Rubber rabbitbrush (*Chrysothamnus nauseosus*)	3
Big sagebrush (*Artemisia tridentata*)	4
Broom snakeweed (*Gutierrezia sarothrae*)	5
Total Shrubs	12
Forbs	**Percent**
Meadow sowthistle (Sonchus arvensis)	1
Bur buttercup (*Ranunculus testiculatus*)	5
Stork's bill (*Erodium cicutarium*)	2
Gray thistle (*Circium undulatum*)	8
Total Forbs	16
Grasses	**Percent**
Cheatgrass (*Bromus tectorum*)	20
Nevada bluegrass (*Poa nevadensis*)	10
Bulbous bluegrass (*Poa bulbosa*)	2
Total Grasses	32
Other	**Percent**
Litter	18
Rock	0
Bare Ground	22
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 2 Date: 05/23/07

Location: 59 steps WNW of Quadrat 1 on a NW facing slope that drains to valley on W side of study area Observers: MS

Shrubs	Percent
Sagebrush (*Artemisia tridentata*)	15
Snakeweed (*Gutierrezia sarothrae*)	1
Total Shrubs	16
Forbs	**Percent**
Sego lily (*Calochortus nutalii*)	1
Total Forbs	1
Grasses	**Percent**
Bluebunch wheatgrass (*Pseudoroegneria spicata*)	30
Nevada bluegrass (*Poa nevadensis*)	5
Cheatgrass (*Bromus tectorum*)	2
Total Grasses	47
Other	**Percent**
Litter	10
Rock	20
Bare Ground	16
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 3 Date: 05/23/07

Location: 12 steps N of base point 1A in area with Junipers Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	30
Snakeweed (Gutierrezia sarothrae)	6
Total Shrubs	36
Forbs	**Percent**
Brodiaea (Brodiaea douglasii)	2
Bur buttercup (Ranunculus testiculatus)	3
Gray thistle (Circium undulatum)	3
Meadow sowthistle (Sonchus arvensis)	1
Total Forbs	9
Grasses	**Percent**
Nevada bluegrass (Poa nevadensis)	15
Cheatgrass (Bromus tectorum)	5
Six-weeks fescue (Festuca octiflora)	2
Total Grasses	22
Other	**Percent**
Litter	3
Rock	0
Bare Ground	30
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 4 Date: 05/23/07

Location: 94 steps NE of Quadrat 3, on steep E facing slope below hill with Junipers Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	15
Snakeweed (Gutierrezia sarothrae)	10
Total Shrubs	25
Forbs	**Percent**
Utah vetch (Astragalus utahensis)	5
Rollins cryptantha or popcorn flower (Cryptantha rollinsii)	5
Unknown forb # 1	1
Brodiaea (Brodiaea douglasii)	Tr
Total Forbs	11
Grasses	**Percent**
Bluebunch wheatgrass (Pseudoroegneria spicata)	15
Nevada bluegrass (Poa nevadensis)	15
Cheatgrass (Bromus tectorum)	4
Total Grasses	34
Other	**Percent**
Litter	5
Rock	15
Bare Ground	10
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 5 Date: 05/23/07

Location: 217 steps N of Base point 2, on hilltop just E of W-facing cliff face Observers: MS

Shrubs	Percent
Total Shrubs	0
Forbs	**Percent**
Sego lily (Calochortus nutalii)	1
Total Forbs	1
Grasses	**Percent**
Bluebunch wheatgrass (Pseudoroegneria spicata)	20
Nevada bluegrass (Poa nevadensis)	4
Cheatgrass (Bromus tectorum)	5
Total Grasses	29
Other	**Percent**
Litter	10
Rock	54
Bare Ground	6
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 6 Date: 05/23/07

Location: 245 steps WNW of Quadrat 5 in valley Observers: MS
N of N facing cliff and W of N-S trending ridge that will be mined first

Shrubs	Percent
Sagebrush (Artemisia tridentata)	5
Total Shrubs	5
Forbs	**Percent**
Pussy toes (Arenaria spp.)	5
Long-leafed phlox (Phlox longifolia)	2
Sego lily (Calochortus nutalii)	1
Total Forbs	8
Grasses	**Percent**
Bluebunch wheatgrass (Pseudoroegneria spicata)	20
Nevada bluegrass (Poa nevadensis)	30
Cheatgrass (Bromus tectorum)	2
Total Grasses	52
Other	**Percent**
Litter	10
Rock	20
Bare Ground	5
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 7 Date: 05/23/07

Location: 245 steps N of Base Point 3, on W facing slope ~ midway along N-S trending ridge that will be mined Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	5
Total Shrubs	5
Forbs	**Percent**
Bur buttercup (Ranunculus testiculatus)	15
Total Forbs	15
Grasses	**Percent**
Nevada bluegrass (Poa nevadensis)	10
Bluebunch wheatgrass (Pseudoroegneria spicata)	25
Moss	5
Total Grasses	40
Other	**Percent**
Litter	8
Rock	20
Bare Ground	12
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 8 Date: 05/23/07

Location: 180 steps S of Quadrat 7 on W facing hill near base of rock rib that juts from top of N-S trending ridge Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	12
Total Shrubs	12
Forbs	**Percent**
Utah astragalus (Astragalus utahensis)	2
Astragalus sp. (small, round lvs, not yet flowering)	1
Total Forbs	3
Grasses	**Percent**
Bluebunch wheatgrass (Pseudoroegneria spicata)	5
Nevada bluegrass (Poa nevadensis)	8
Cheatgrass (Bromus tectorum)	2
Total Grasses	15
Moss (Grouped with Litter)	5
Other	**Percent**
Litter	10
Rock	40
Bare Ground	15
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 9 Date: 05/23/07

Location: 91 steps SW of Base Point 4, Slightly NW facing Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	72
Total Shrubs	72
Forbs	**Percent**
Total Forbs	0
Grasses	**Percent**
Cheatgrass (Bromus tectorum)	13
Total Grasses	13
Other	**Percent**
Litter	15
Rock	0
Bare Ground	0
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 10 Date: 05/23/07

Location: 90 steps SE of Quadrat 9 on sandy part of hill, W facing Observers: MS

Shrubs	Percent
Snakeweed (Gutierrezia sarothrae)	10
Total Shrubs	10
Forbs	**Percent**
Rollins cryptantha or popcorn flower (Cryptantha rollinsii)	5
Hedysarum boreale	1
Unknown Forb # 2 – willow herb?	1
Total Forbs	7
Grasses	**Percent**
Needleandthread grass (Stipa comata)	18
Nevada bluegrass (Poa nevadensis)	17
Cheatgrass (Bromus tectorum)	3
Total Grasses	37
Other	**Percent**
Litter	5
Rock	25
Bare Ground	15
Total Cover (should equal 100%)	

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 11 Date: 05/23/07

Location: Sand dune between Qudrat 10 and Base Point 5, 242 steps N of Q10 Observers: MS

Shrubs	Percent
Snakeweed (Gutierrezia sarothrae)	10
Total Shrubs	10
Forbs	**Percent**
Bastard toadflax (Comandra umbellata)	3
Hedysarum boreale	3
Total Forbs	6
Grasses	**Percent**
Needleandthread grass (Stipa comata)	30
Nevada bluegrass (Poa nevadensis)	20
Cheatgrass (Bromus tectorum)	12
Total Grasses	62
Other	**Percent**
Litter	10
Rock	2
Bare Ground	10
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 12 Date: 05/23/07

Location: 180 steps WSW of Base Pt 5, on N facing hill, about 250' E of road, gravelly Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	5
Total Shrubs	5
Forbs	**Percent**
Sego lily (Calochortus nutalii)	1
Bastard toadflax (Comandra umbellata)	2
Utah astragalus (Astragalus utahensis)	1
Total Forbs	4
Grasses	**Percent**
Nevada bluegrass (Poa nevadensis)	45
Bluebunch wheatgrass (Pseudoroegneria spicata)	3
Total Grasses	48
Other	**Percent**
Litter	10
Rock	23
Bare Ground	10
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 13 Date: 05/23/07

Location: 120 steps ESE of Quad 12, N facing slope, gravelly Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	25
Total Shrubs	25
Forbs	**Percent**
Death camas ()	2
Total Forbs	2
Grasses	**Percent**
Nevada bluegrass (Poa nevadensis)	5
Cheatgrass (Bromus tectorum)	5
Total Grasses	10
Other	**Percent**
Litter	5
Rock	10
Bare Ground	48
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

Property: Geneva Grantsville Quarry

Quadrat #: 14 Date: 05/23/07

Location: 75 steps SE of Quad 13 on NW facing hill Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	10
Snakeweed (Gutierrezia sarothrae)	3
Total Shrubs	13
Forbs	**Percent**
Bur buttercup (Ranunculus testiculatus)	4
Sego lily (Calochortus nutalii)	Tr
Meadow sowthistle	1
Astragalus sp (small rounded leaflets, no flowers)	3
Total Forbs	8
Grasses	**Percent**
Cheatgrass (Bromus tectorum)	20
Nevada bluegrass (Poa nevadensis)	25
Total Grasses	45
Moss (Included in counts with Litter)	12
Other	**Percent**
Litter	17
Rock	0
Bare Ground	5
Total Cover (should equal 100%)	100

VEGETATION SURVEY FORM

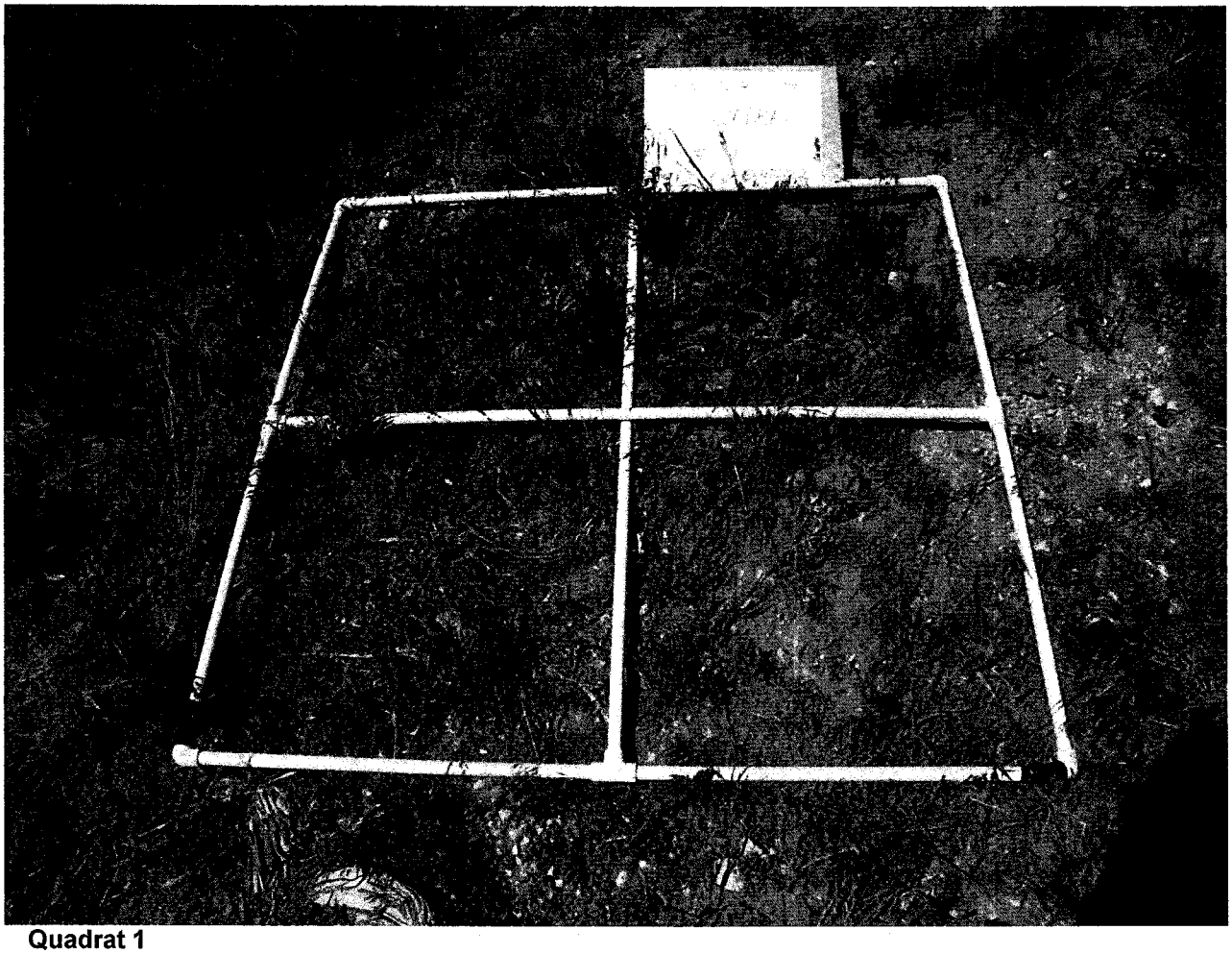
Property: Geneva Grantsville Quarry

Quadrat #: 15 Date: 05/23/07

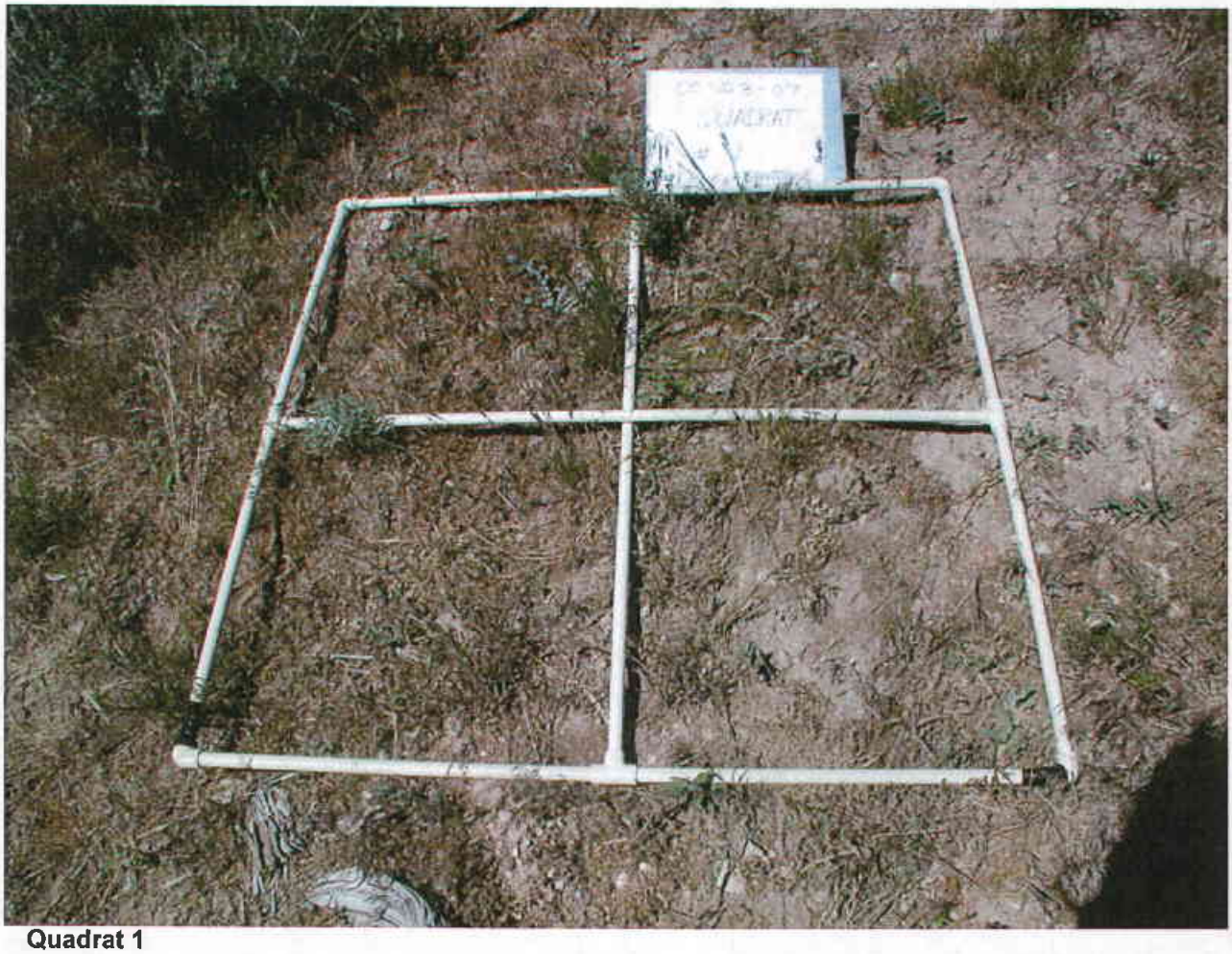
Location: 26 steps N of Quadrat 14, of Base Pt 5. Flat to slightly NE slope Observers: MS

Shrubs	Percent
Sagebrush (Artemisia tridentata)	30
Snakeweed (Gutierrezia sarothrae)	1
Total Shrubs	31
Forbs	**Percent**
Total Forbs	0
Grasses	**Percent**
Nevada bluegrass (Poa nevadensis)	3
Cheatgrass	8
Total Grasses	11
Other	**Percent**
Litter	5
Rock	3
Bare Ground	50
Total Cover (should equal 100%)	100

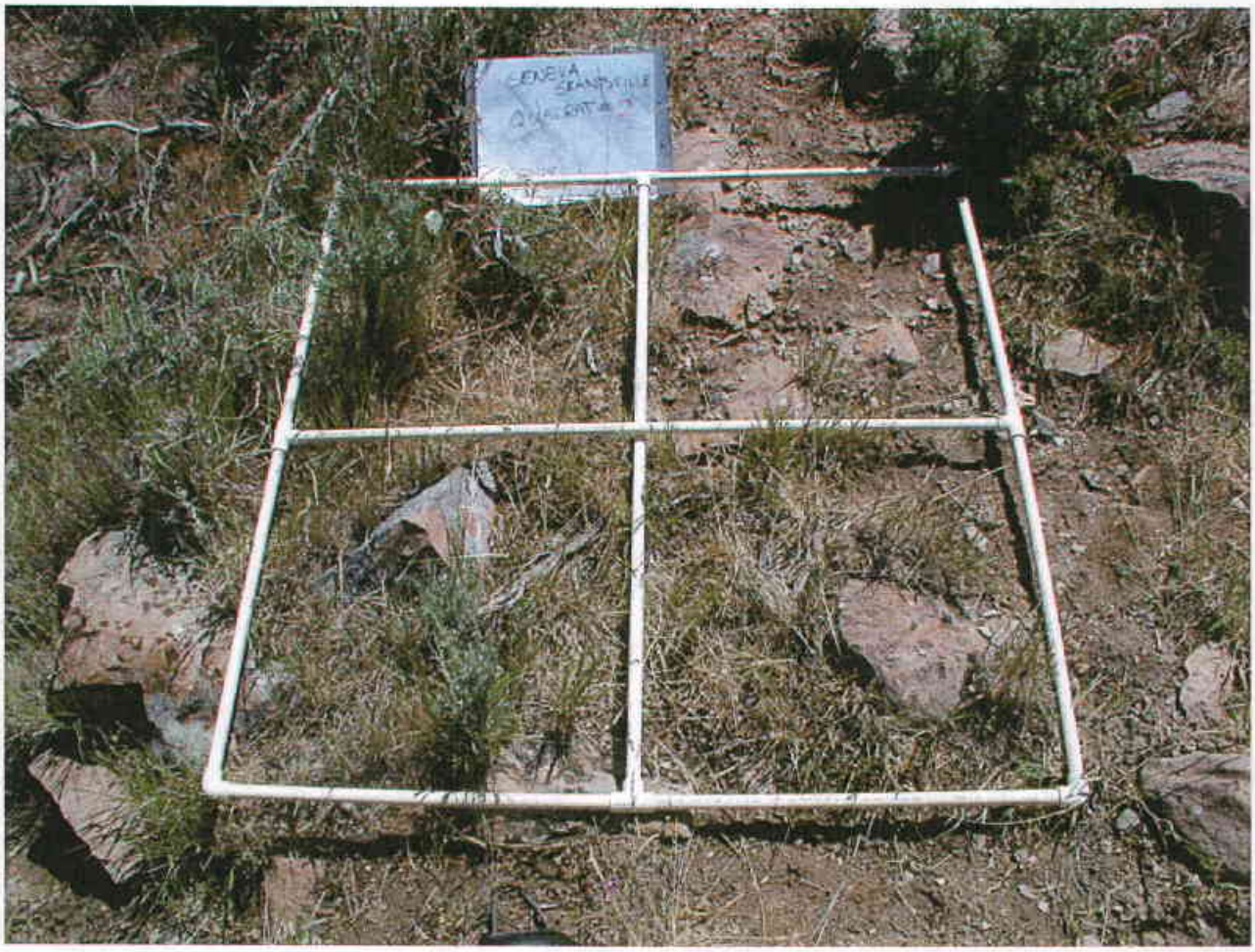
QUADRAT PHOTOS



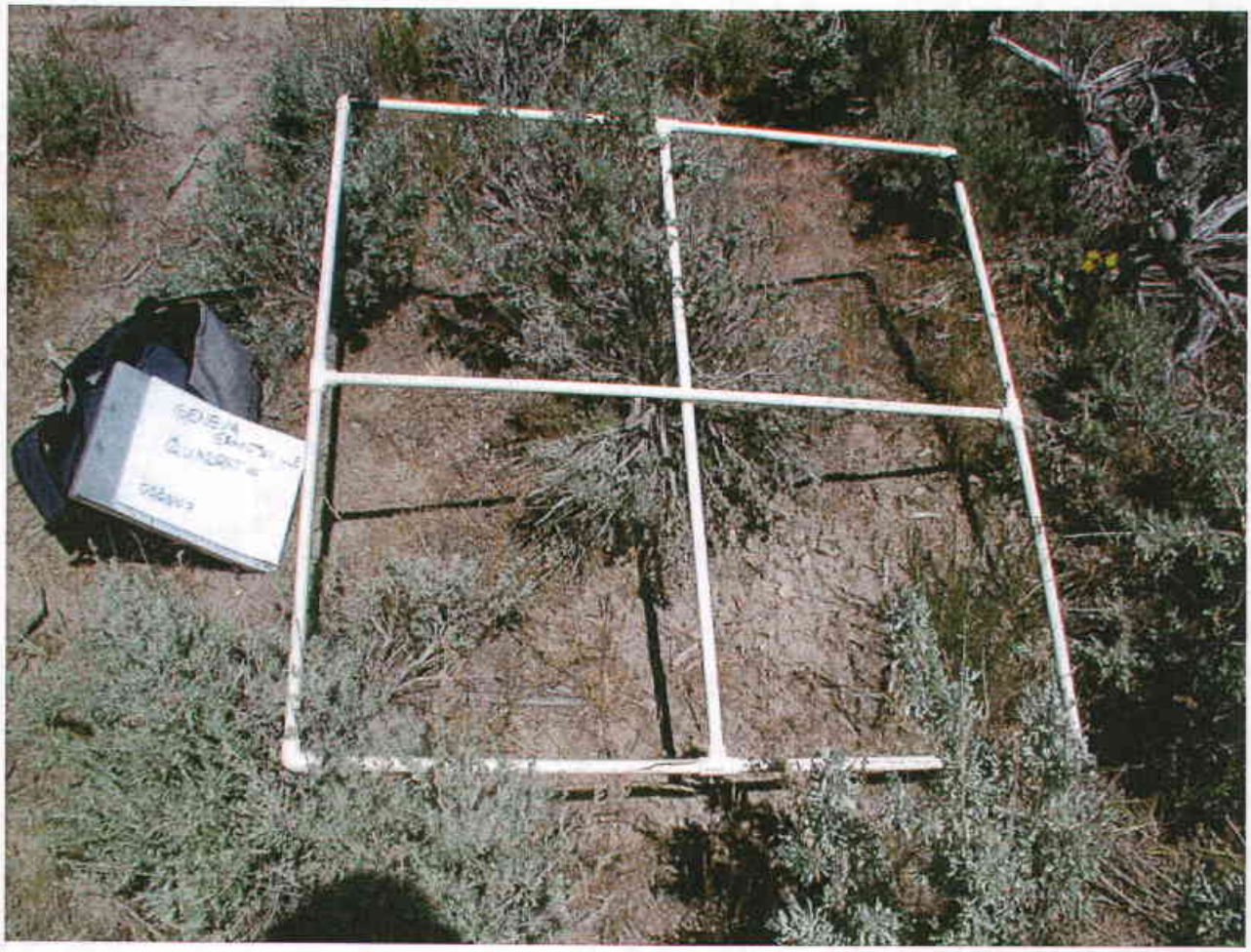
Quadrat 1
Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007
Photo by M. Sawyer



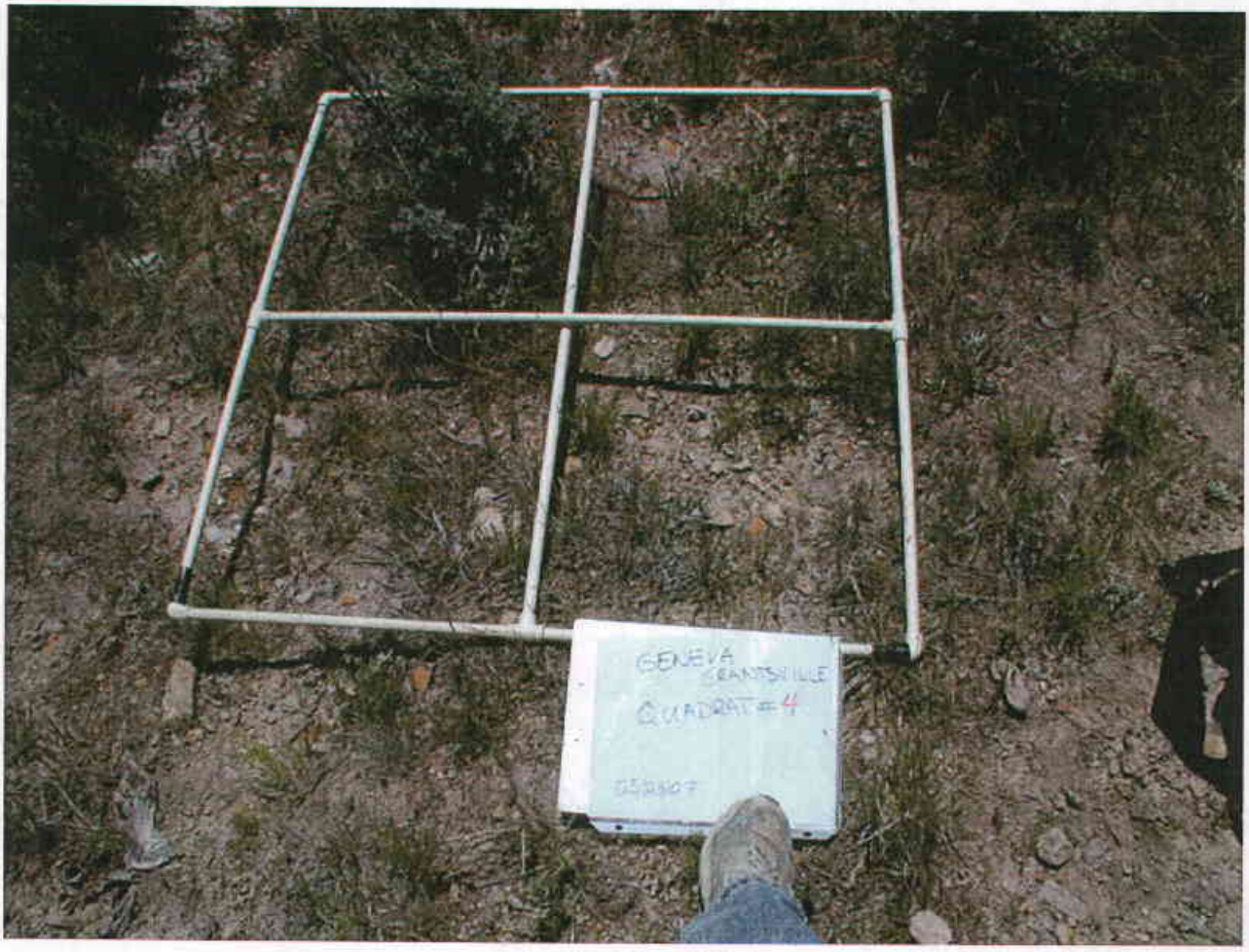
Quadrat 1
Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007
Photo by M. Sawyer



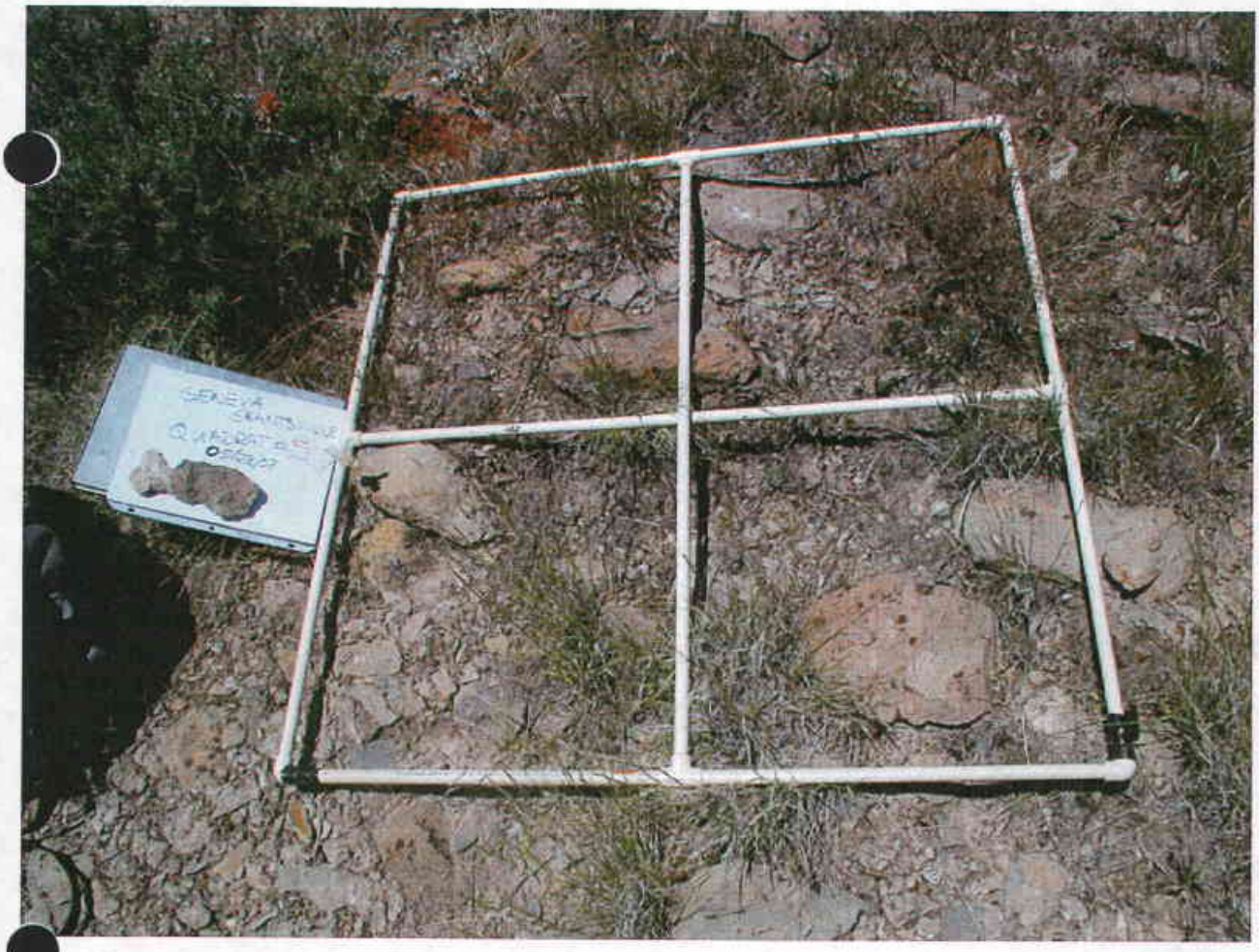
Quadrat 2
Grantsville Quarry NOI, Geneva Rock Products, May 23, 2007
Photo by M. Sawyer



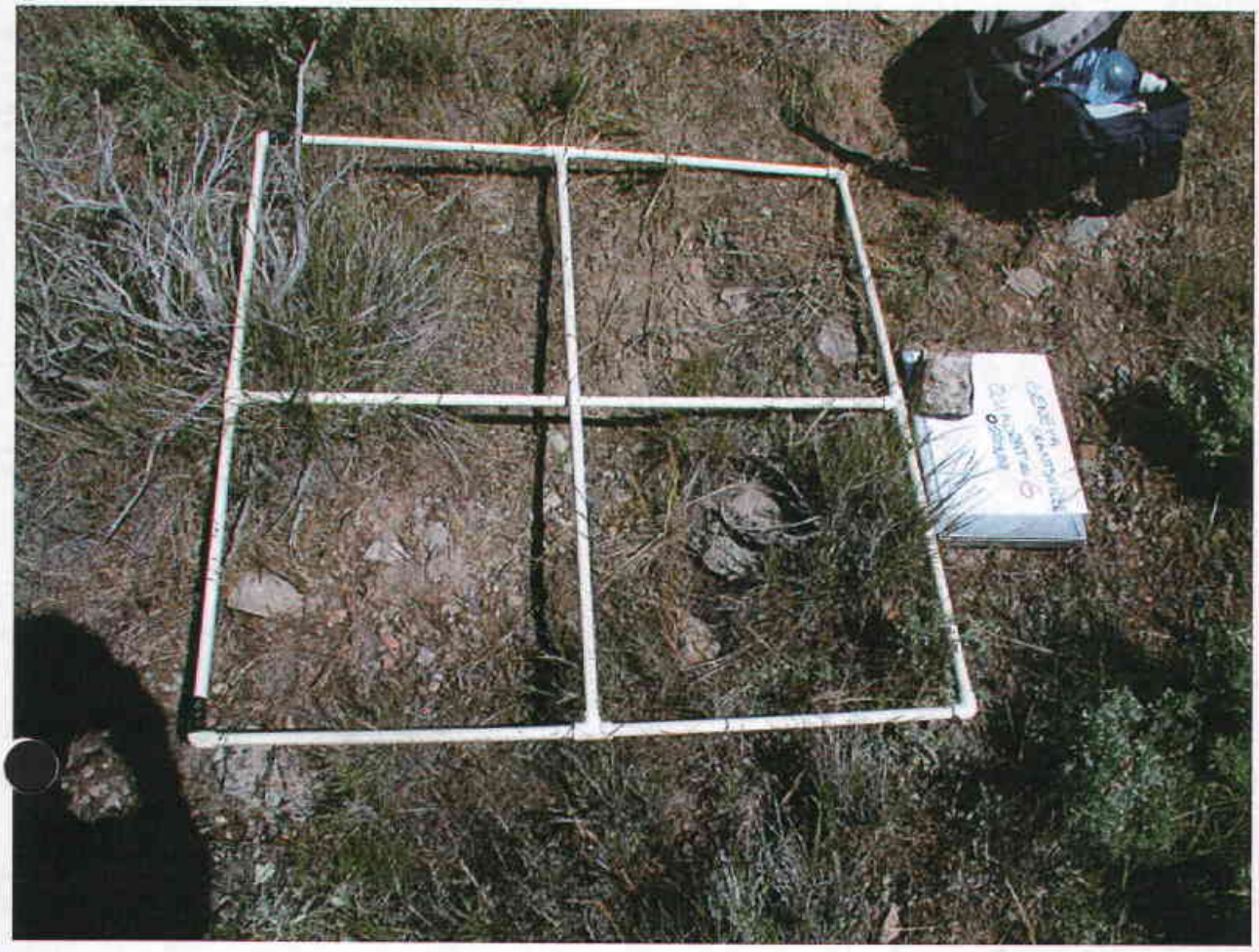
Quadrat 3
Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007
Photo by M. Sawyer



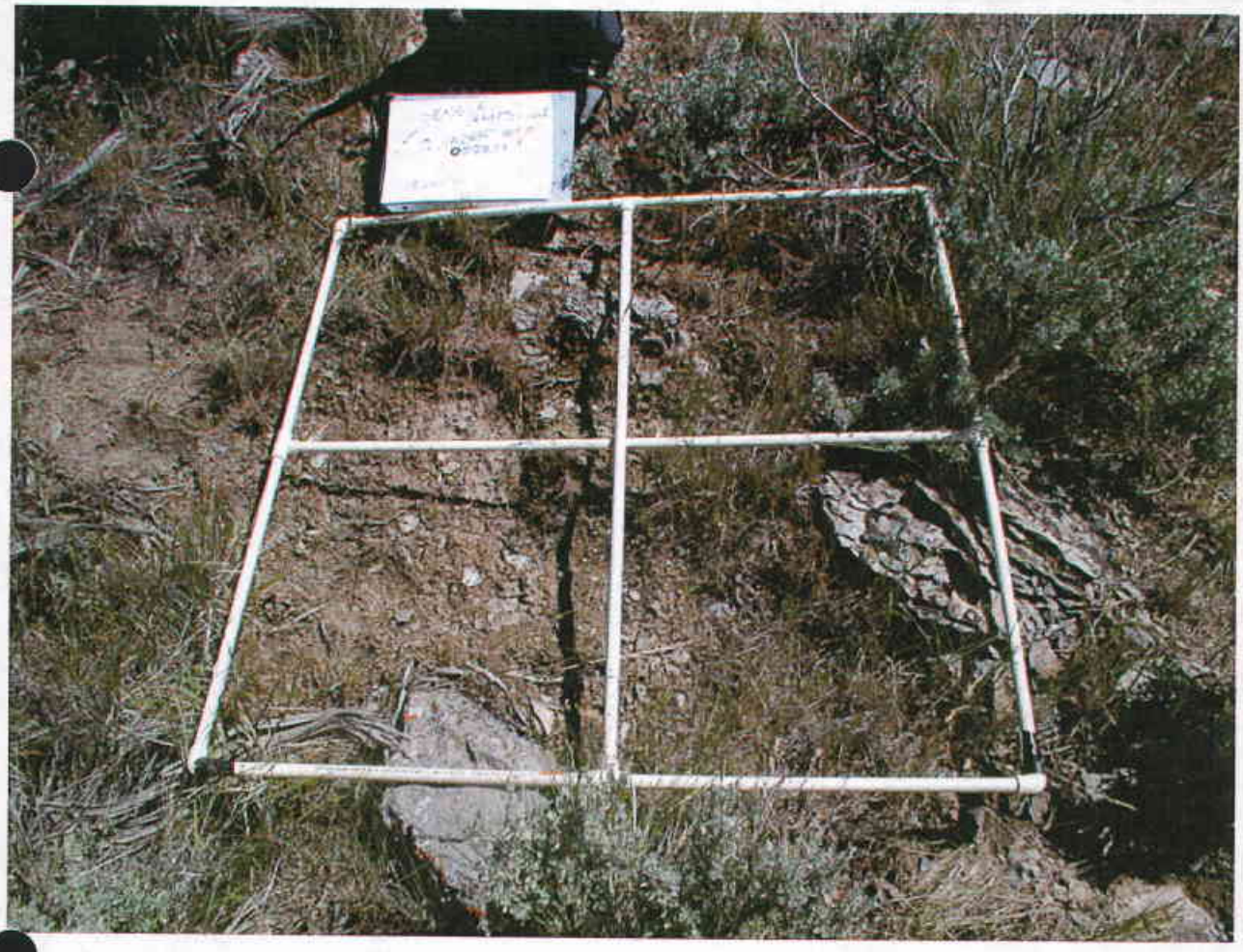
Quadrat 4 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007
Photo by M. Sawyer



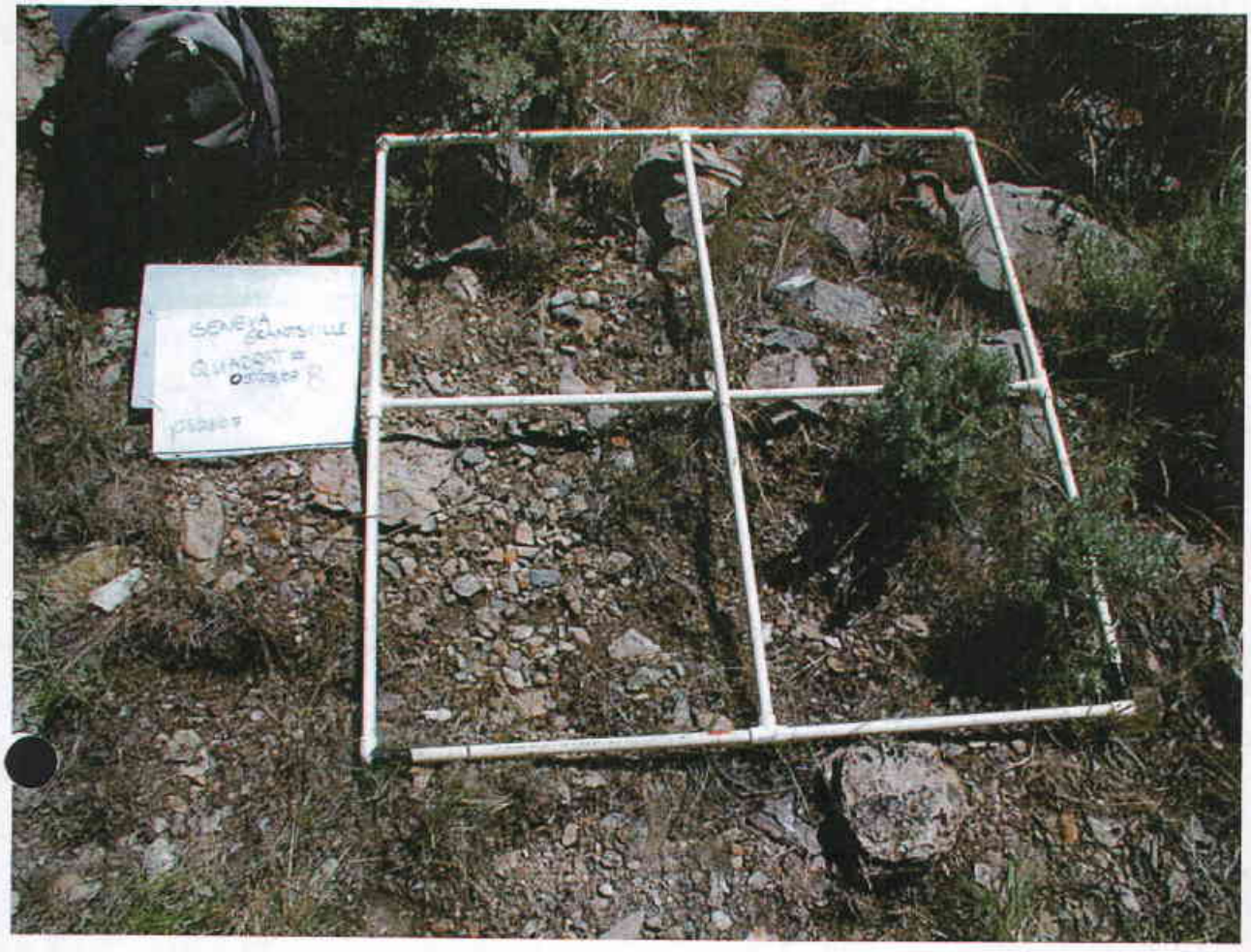
Quadrat 5 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007 Photo by M. Sawyer



Quadrat 5 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007 Photo by M. Sawyer

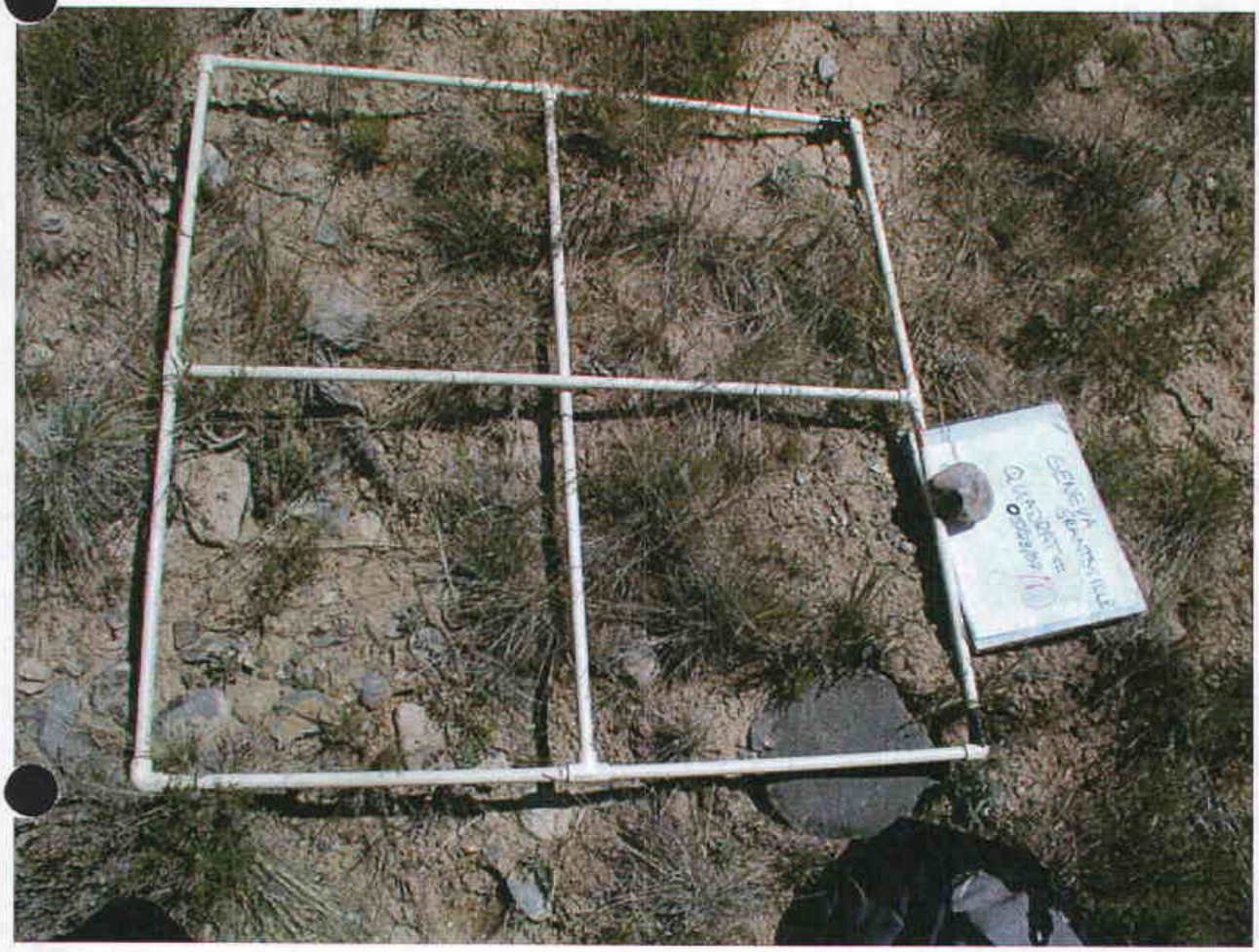


Quadrat 7 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007 Photo by M. Sawyer



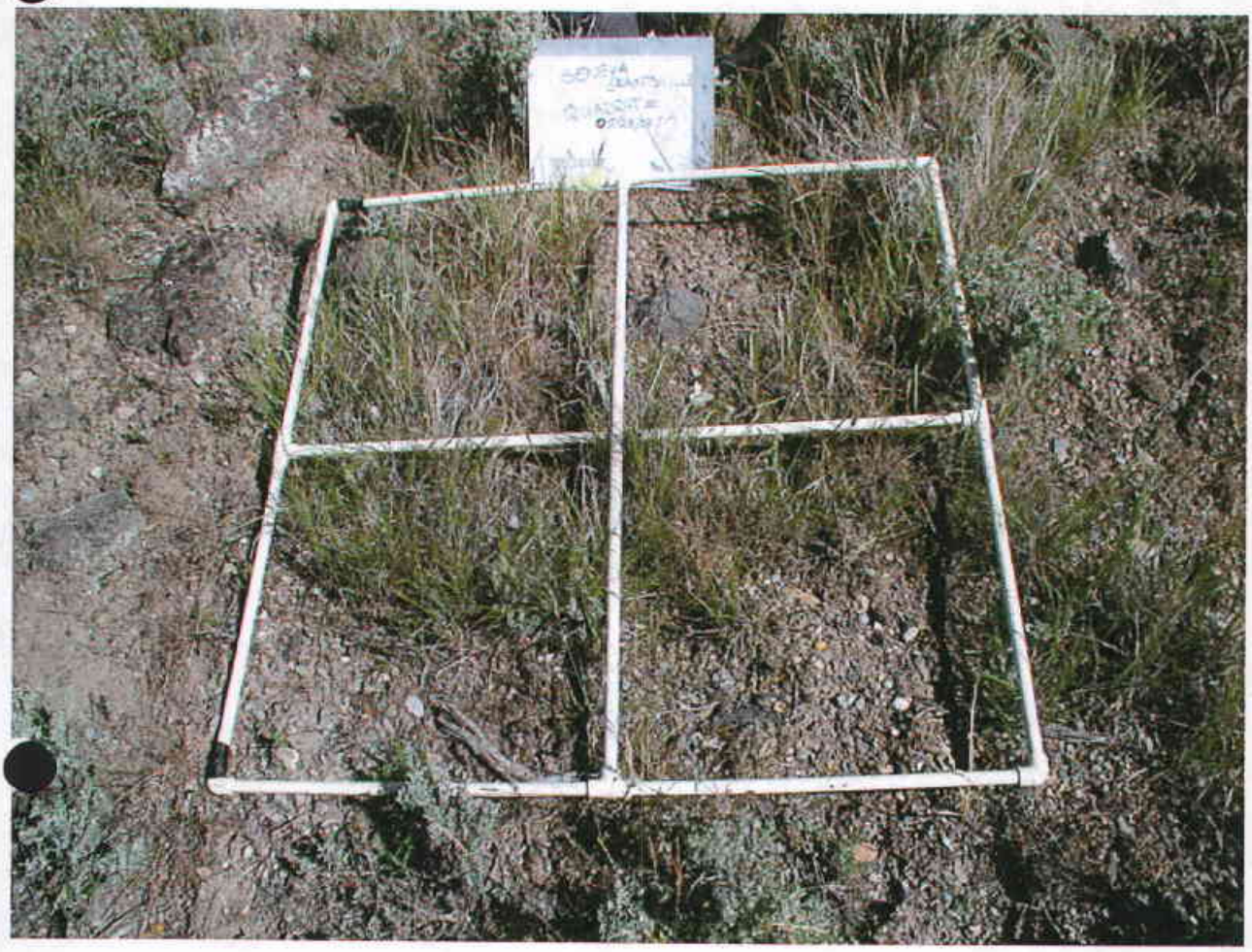
Quadrat 8 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007 Photo by M. Sawyer

Quadrat 9 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007, Photo by M. Sawyer

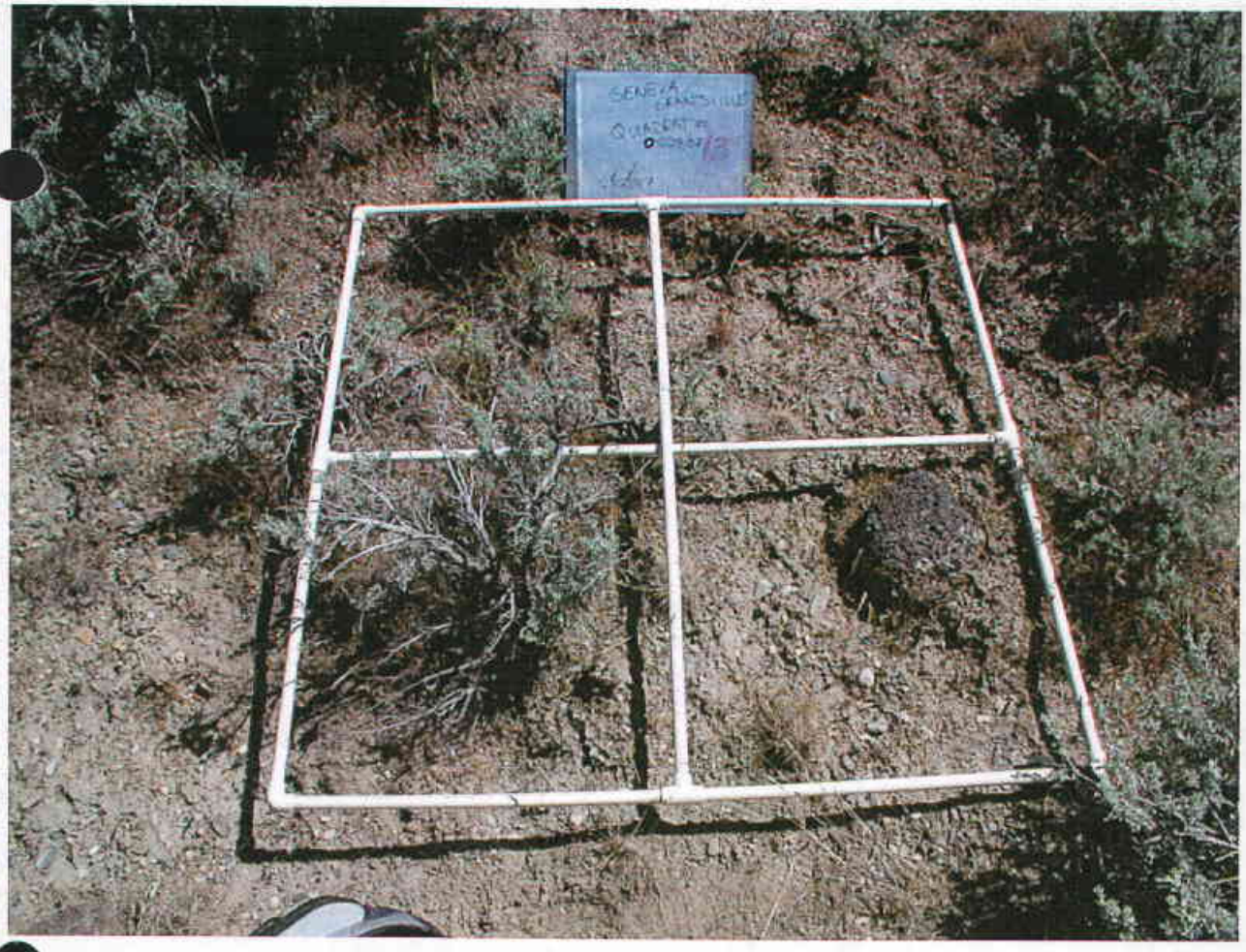


Quadrat 10 Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007, Photo by M. Sawyer

Quadrat 11
Grantsville
Quarry NOI,
Geneva Rock
Products,
Data
collected May
23, 2007
Photo taken
by M. Sawyer

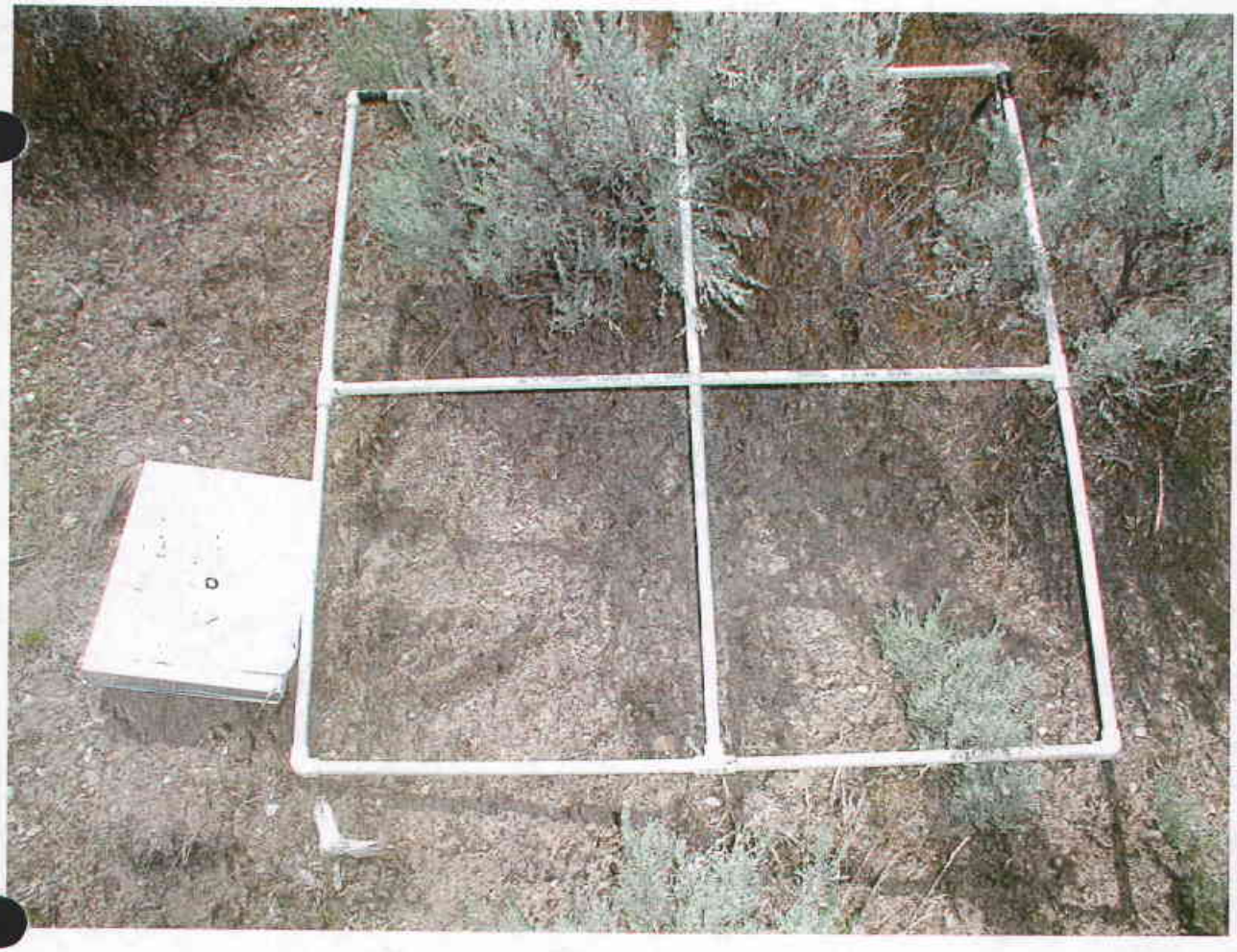


Quadrat 12
Grantsville
Quarry NOI,
Geneva Rock
Products,
Data
collected May
23, 2007
Photo by M.
Sawyer



Quadrat 13, Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007 Photo by M. Sawyer

Quadrat 14, Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007, Photos by M. Sawyer



Quadrat 15, Grantsville Quarry NOI, Geneva Rock Products, Data collected May 23, 2007, Photo by M. Sawyer

END

Appendix C
Soil Sample Results

BRIGHAM YOUNG UNIVERSITY

Soil and Plant Analysis Laboratory
255 WIDB
Provo, UT 84602
801-422-2147

Plant and Wildlife Sciences Department

Name Geneva Rock
Street 730 N. 1500 W.
Orem Utah 84057
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 9-Sep-09
Telephone: 801-360-1344
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
TP 1	Turf	7.44	28.36	49.08	22.56	Loam		3.22

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Nitrate-Nitrogen ppm N	11.12		X				apply 2.1 lbs of N/1000 sq ft
Phosphorus ppm P	21.12			X			no fertilizer needed
Potassium ppm K	579.20					X	no fertilizer needed
Salinity-ECe dS/m	0.77	X					no salinity problem
Iron ppm Fe	6.88			X			no fertilizer needed
SAR-Sodium Absorption Ratio	0.86	X					no sodium hazard
Calcium-SAR ppm Ca	132.16						
Magnesium SAR ppm Mg	17.76						
Sodium SAR ppm Na	39.84						

Notes:

BRIGHAM YOUNG UNIVERSITY

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255 WIDB
Provo, UT 84602
801-422-2147

Plant and Wildlife Sciences Department

Name Geneva Rock
Street 730 N. 1500 W.
Orem Utah 84057
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 9-Sep-09
Telephone: 801-360-1344
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
TP 2	Turf	7.28	46.72	34.72	18.56	Loam		2.72

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Nitrate-Nitrogen ppm N	3.84	X					apply 2.8 lbs of N/1000 sq ft
Phosphorus ppm P	4.05	X					apply 2.1 lbs of P2O5/1000 sq ft
Potassium ppm K	195.20				X		no fertilizer needed
Salinity-ECe dS/m	0.86	X					no salinity problem
Iron ppm Fe	7.84			X			no fertilizer needed
SAR-Sodium Absorption Ratio	0.56	X					no sodium hazard
Calcium-SAR ppm Ca	188.64						
Magnesium SAR ppm Mg	18.72						
Sodium SAR ppm Na	30.08						

Notes:

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Orem Utah 84057
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 9-Sep-09
Telephone: 801-360-1344
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
TP 3	Turf	7.43	50.72	25.72	23.56	Sandy Clay Loam		1.56

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Nitrate-Nitrogen ppm N	5.02	X					apply 2.8 lbs of N/1000 sq ft
Phosphorus ppm P	4.70	X					apply 2.1 lbs of P2O5/1000 sq ft
Potassium ppm K	188.80				X		no fertilizer needed
Salinity-ECe dS/m	0.60	X					no salinity problem
Iron ppm Fe	9.78			X			no fertilizer needed
SAR-Sodium Absorption Ratio	0.70	X					no sodium hazard
Calcium-SAR ppm Ca	109.92						
Magnesium SAR ppm Mg	9.44						
Sodium SAR ppm Na	28.64						

Notes:

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Orem Utah 84057
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 9-Sep-09
Telephone: 801-360-1344
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
TP 4	Turf	7.56	29.08	38.36	32.56	Clay Loam		2.25

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Nitrate-Nitrogen ppm N	8.01	X					apply 2.8 lbs of N/1000 sq ft
Phosphorus ppm P	5.88	X					apply 2.1 lbs of P2O5/1000 sq ft
Potassium ppm K	412.80					X	no fertilizer needed
Salinity-ECe dS/m	0.55	X					no salinity problem
Iron ppm Fe	5.76			X			no fertilizer needed
SAR-Sodium Absorption Ratio	0.74	X					no sodium hazard
Calcium-SAR ppm Ca	92.48						
Magnesium SAR ppm Mg	12.48						
Sodium SAR ppm Na	28.64						

Notes:

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Orem Utah 84057
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 9-Sep-09
Telephone: 801-360-1344
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
TP 5	Turf	7.47	30.08	47.36	22.56	Loam		2.75

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Nitrate-Nitrogen ppm N	9.35	X					apply 2.8 lbs of N/1000 sq ft
Phosphorus ppm P	14.46		X				apply 1.4 lbs of P2O5/1000 sq ft
Potassium ppm K	438.40					X	no fertilizer needed
Salinity-ECe dS/m	0.64	X					no salinity problem
Iron ppm Fe	6.30			X			no fertilizer needed
SAR-Sodium Absorption Ratio	0.68	X					no sodium hazard
Calcium-SAR ppm Ca	124.64						
Magnesium SAR ppm Mg	11.52						
Sodium SAR ppm Na	29.60						

Notes:

BRIGHAM YOUNG UNIVERSITY

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Plant and Wildlife Sciences Department

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Street 730 N. 1500 W.
Orem Utah 84057
City State Zip

SOIL TEST REPORT AND RECOMMENDATIONS

Date: 9-Sep-09
Telephone: 801-360-1344
Fax:

Sample Identification	Crop to be grown	pH	% Sand	% Silt	% Clay	Soil Texture	Cation Exchange meq/100g	% Organic Matter
TP 6	Turf	7.29	32.72	38.72	28.56	Clay Loam		2.01

Soil Test	Results	Very Low	Low	Medium	High	Very High	Recommendations
Nitrate-Nitrogen ppm N	33.32				X		apply 0.7 lbs of N/1000 sq ft
Phosphorus ppm P	6.31	X					apply 2.1 lbs of P2O5/1000 sq ft
Potassium ppm K	284.80				X		no fertilizer needed
Salinity-ECe dS/m	1.38		X				no salinity problem
Iron ppm Fe	8.12			X			no fertilizer needed
SAR-Sodium Absorption Ratio	0.92	X					no sodium hazard
Calcium-SAR ppm Ca	236.32						
Magnesium SAR ppm Mg	18.56						
Sodium SAR ppm Na	54.56						

Notes:

Appendix D
Correspondence

Intermountain Ecosystems, LLC.
270 east 1230 north
Springville, Ut. 84663
801-489-4590

23 September 2009

Brent Sumsion
Geneva Rock Products, Inc.
730 North 1500 West
Orem, Utah 84059

RE: N Grantsville Quarry, Utah –Wetland & T&E Inventory

Dear Brent:

On 22 September, I inventoried the proposed N. Grantsville Quarry and access road for the occurrence of Jurisdictional Wetlands administered under the Clean Water Act and regulated by the U.S. Army Corps of Engineers (ACOE) Threatened and Endangered Species administered by the U.S. Fish and Wildlife Service.

The parcel is located in Tooele County at Latitude 40^0 38'. 570.6" N and Latitude 112^0 33.358.6" W. The parcel is upland vegetation dominated to big sagebrush and grass. There are no aquatics features or T&E plant or animal species on the property. Therefore, I concluded that a "No Affects " determination be concluded for the project area of 439 acres and would be cleared for future excavation of fill.

I have both photographs and data forms on file if they are needed for future correspondence with the ACOE. Thanks for the opportunity to work on this project. If there are any questions, please contact me.

Sincerely,

Ronald J. Kass, Ph.D.
Botanist ,Professional Wetland Scientist (000126

JON M. HUNTSMAN, JR.
Governor
GARY R. HERBERT
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Wildlife Resources
JAMES F. KARPOWITZ
Division Director

May 30, 2007

Marit Sawyer
JBR Environmental Consultants, Inc.
8160 S. Highland Drive,
Sandy, Utah 84093

Subject: Species of Concern Near the Proposed Gravel Quarry, Tooele County

Dear Marit Sawyer:

I am writing in response to your email dated May 24, 2007 regarding information on species of special concern proximal to the proposed gravel quarry to be located northwest of Grantsville in Sections 17, 18, 19, and 20 of Township 2 South, Range 6 West, SLB&M, in Tooele County, Utah.

The Utah Division of Wildlife Resources (UDWR) does not have records of occurrence for any threatened, endangered, or sensitive species within the project area noted above or within a 1-mile radius.

The information provided in this letter is based on data existing in the Utah Division of Wildlife Resources' central database at the time of the request. It should not be regarded as a final statement on the occurrence of any species on or near the designated site, nor should it be considered a substitute for on-the-ground biological surveys. Moreover, because the Utah Division of Wildlife Resources' central database is continually updated, and because data requests are evaluated for the specific type of proposed action, any given response is only appropriate for its respective request.

In addition to the information you requested, other significant wildlife values might also be present on the designated site. Please contact UDWR's habitat manager for the central region, Ashley Green, at (801) 491-5654 if you have any questions.

Please contact our office at (801) 538-4759 if you require further assistance.

Sincerely,

Sarah Lindsey

Sarah Lindsey
Information Manager
Utah Natural Heritage Program

cc: Ashley Green, CRO

1594 W. North Temple, Suite 2110, PO Box 146301, Salt Lake City, UT 84114-6301
telephone (801) 538-4700 • facsimile (801) 538-4709 • TTY (801) 538-7458 • *www.wildlife.utah.gov*

UTAH DNR WILDLIFE RESOURCES

Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series.* All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas.* Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties

1—Abela gravelly loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 4,600 to 6,000 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 160 days

Map Unit Composition

Abela and similar soils: 90 percent

Description of Abela

Setting

Landform: Fan remnants
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and/or alluvium derived from quartzite

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability (nonirrigated): 6s
Ecological site: Upland Gravelly Loam (Mountain Big Sagebrush) (R028AY306UT)

Typical profile

0 to 10 inches: Gravelly loam
10 to 20 inches: Gravelly loam
20 to 60 inches: Very gravelly loam

2—Abela very gravelly loam, 5 to 15 percent slopes

Map Unit Setting

Elevation: 5,000 to 6,000 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 120 to 160 days

Map Unit Composition

Abela and similar soils: 90 percent

Description of Abela

Setting

Landform: Fan remnants
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from limestone and/or alluvium derived from quartzite

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Low (about 4.5 inches)

Interpretive groups

Land capability (nonirrigated): 6s

Typical profile

0 to 11 inches: Very gravelly loam
11 to 22 inches: Very gravelly loam
22 to 60 inches: Extremely gravelly sandy loam

4—Amtoft-Rock outcrop complex, 30 to 70 percent slopes

Map Unit Setting

Elevation: 5,500 to 7,000 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 45 to 48 degrees F
Frost-free period: 100 to 140 days

Map Unit Composition

Amtoft and similar soils: 65 percent
Rock outcrop: 15 percent

Description of Amtoft

Setting

Landform: Mountainsides, hillsides
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and/or residuum weathered from limestone

Properties and qualities

Slope: 30 to 70 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Very low (about 1.3 inches)

Interpretive groups
Land capability (nonirrigated): 7e

Typical profile
0 to 9 inches: Very cobbly loam
9 to 16 inches: Extremely cobbly loam
16 to 26 inches: Bedrock

Description of Rock Outcrop

Setting
Landform: Hillsides, mountainsides
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Interpretive groups
Land capability (nonirrigated): 8s

22—Hiko Peak very stony loam, 2 to 8 percent slopes

Map Unit Setting
Elevation: 4,900 to 5,300 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 100 to 140 days

Map Unit Composition
Hiko peak and similar soils: 90 percent

Description of Hiko Peak

Setting
Landform: Fan remnants
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Mixed alluvium

Properties and qualities
Slope: 2 to 8 percent
Surface area covered with cobbles, stones or boulders: 10.0 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 40 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water capacity: Low (about 4.5 inches)

Interpretive groups
Land capability (nonirrigated): 7s
Ecological site: Semidesert Stony Loam (Black Sagebrush) (R028AY252UT)

Typical profile
0 to 4 inches: Very stony loam
4 to 12 inches: Very stony loam
12 to 60 inches: Extremely gravelly sandy loam

38—Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes

Map Unit Setting
Elevation: 6,000 to 8,500 feet
Mean annual precipitation: 12 to 22 inches
Mean annual air temperature: 39 to 50 degrees F
Frost-free period: 80 to 120 days

Map Unit Composition
Lodar and similar soils: 40 percent
Lundy and similar soils: 30 percent
Rock outcrop: 10 percent

Description of Lodar

Setting
Landform: Mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and/or residuum weathered from limestone

Properties and qualities
Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 3.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 80 percent
Available water capacity: Very low (about 1.6 inches)

Interpretive groups
Land capability (nonirrigated): 7e

Typical profile

0 to 8 inches: Very cobbly loam
8 to 16 inches: Very cobbly loam
16 to 26 inches: Unweathered bedrock

Description of Lundy

Setting

Landform: Mountainsides
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Colluvium derived from limestone and/or residuum weathered from limestone

Properties and qualities

Slope: 30 to 60 percent
Surface area covered with cobbles, stones or boulders: 5.0 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 60 percent
Available water capacity: Very low (about 1.8 inches)

Interpretive groups

Land capability (nonirrigated): 7e
Ecological site: Mountain Shallow Loam (Low Sagebrush) (R047XA442UT)

Typical profile

0 to 11 inches: Very cobbly loam
11 to 18 inches: Very cobbly loam
18 to 28 inches: Unweathered bedrock

Description of Rock Outcrop

Setting

Landform: Hillsides, mountainsides
Landform position (three-dimensional): Mountainflank, side slope
Down-slope shape: Convex
Across-slope shape: Convex

Interpretive groups

Land capability (nonirrigated): 8s

Data Source Information

Soil Survey Area: Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties
Survey Area Data: Version 4, Dec 7, 2006

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Physical Soil Properties– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
1—Abela gravelly loam, 2 to 8 percent slopes														
Abela	0-10	-45-	-41-	10-14- 18	1.25-1.35	14.00-42.00	0.11-0.14	0.0-2.9	2.0-4.0	.15	.28	3	5	56
	10-20	-45-	-41-	10-14- 18	1.30-1.40	14.00-42.00	0.11-0.14	0.0-2.9	0.0-1.0	.20	.37			
	20-60	-45-	-41-	10-14- 18	1.35-1.50	14.00-42.00	0.08-0.11	0.0-2.9	0.5-1.0	.15	.43			
2—Abela very gravelly loam, 5 to 15 percent slopes														
Abela	0-11	-45-	-41-	10-14- 18	1.25-1.35	14.00-42.00	0.08-0.11	0.0-2.9	2.0-4.0	.15	.28	3	6	48
	11-22	-45-	-41-	10-14- 18	1.30-1.40	14.00-42.00	0.08-0.11	0.0-2.9	0.5-1.0	.10	.32			
	22-60	-67-	-19-	10-14- 18	1.35-1.50	14.00-42.00	0.05-0.06	0.0-2.9	0.5-1.0	.05	.28			
4—Amtoft-Rock outcrop complex, 30 to 70 percent slopes														
Amtoft	0-9	-44-	-41-	12-15- 18	1.30-1.45	14.00-42.00	0.08-0.11	0.0-2.9	1.0-2.0	.10	.37	1	6	48
	9-16	-44-	-40-	12-16- 20	1.30-1.45	14.00-42.00	0.05-0.07	0.0-2.9	0.0-1.0	.05	.32			
	16-26	—	—	—	—	0.00-4.00	—	—	—					
Rock outcrop	—	—	—	—	—	—	—	—	—					

Physical Soil Properties– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties														
Map symbol and soil name	**Depth**	**Sand**	**Silt**	**Clay**	**Moist bulk density**	**Saturated hydraulic conductivity**	**Available water capacity**	**Linear extensibility**	**Organic matter**	**Erosion factors**			**Wind erodibility group**	**Wind erodibility index**
										Kw	**Kf**	**T**		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
22—Hiko Peak very stony loam, 2 to 8 percent slopes														
Hiko peak	0-4	-45-	-41-	10-14- 18	1.30-1.40	14.00-42.00	0.08-0.11	0.0-2.9	1.0-2.0	.10	.37	5	6	48
	4-12	-45-	-41-	10-14- 18	1.35-1.45	14.00-42.00	0.08-0.11	0.0-2.9	0.5-1.0	.10	.32			
	12-60	-67-	-19-	10-14- 18	1.40-1.50	14.00-42.00	0.05-0.08	0.0-2.9	0.5-1.0	.05	.17			
38—Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes														
Lodar	0-8	-40-	-38-	18-23- 27	1.20-1.30	4.00-14.00	0.08-0.11	0.0-2.9	2.0-4.0	.05	.17	1	6	48
	8-16	-40-	-38-	18-23- 27	1.30-1.40	4.00-14.00	0.08-0.11	0.0-2.9	0.5-1.0	.10	.37			
	16-26	—	—	—	—	0.00-4.00	—	—	—					
Lundy	0-11	-40-	-38-	18-23- 27	1.20-1.30	4.00-14.00	0.08-0.11	0.0-2.9	2.0-4.0	.05	.17	1	6	48
	11-18	-40-	-38-	18-23- 27	1.30-1.40	4.00-14.00	0.08-0.11	0.0-2.9	0.0-1.0	.10	.37			
	18-28	—	—	—	—	0.00-4.00	—	—	—					
Rock outcrop	—	—	—	—	—	—	—	—	—					

Data Source Information

Soil Survey Area: Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties
Survey Area Data: Version 4, Dec 7, 2006

Rangeland Productivity

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

This table shows, for each soil that supports rangeland vegetation, the ecological site and the potential annual production of vegetation in favorable, normal, and unfavorable years. An explanation of the column headings in the table follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of a site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service (NRCS).

Total dry-weight production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percent of air-dry moisture content.

Range management requires knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in the "National Range and Pasture Handbook," which is available in local offices of NRCS or on the Internet.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service, National range and pasture handbook.

Report—Rangeland Productivity

Rangeland Productivity– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties				
Map unit symbol and soil name	**Ecological site**	**Total dry-weight production**		
		Favorable year	**Normal year**	**Unfavorable year**
		Lb/ac	*Lb/ac*	*Lb/ac*
1—Abela gravelly loam, 2 to 8 percent slopes				
Abela	Upland Gravelly Loam (mountain Big Sagebrush)	1,000	800	400
2—Abela very gravelly loam, 5 to 15 percent slopes				
Abela	—	850	650	350
4—Amtoft-Rock outcrop complex, 30 to 70 percent slopes				
Amtoft	—	900	700	500
Rock outcrop	—	—	—	—
22—Hiko Peak very stony loam, 2 to 8 percent slopes				
Hiko peak	Semidesert Stony Loam (black Sagebrush)	700	600	400
38—Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes				
Lodar	—	700	500	200
Lundy	Mountain Shallow Loam (low Sagebrush)	800	600	400
Rock outcrop	—	—	—	—

Data Source Information

Soil Survey Area: Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties
Survey Area Data: Version 4, Dec 7, 2006

Rangeland Productivity and Plant Composition

In areas that have similar climate and topography, differences in the kind and amount of rangeland or forest understory vegetation are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

This table shows, for each soil that supports vegetation suitable for grazing, the ecological site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. An explanation of the column headings in the table follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of the site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service (NRCS).

Total dry-weight production is the amount of vegetation that can be expected to grow annually in a well managed area that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percent of air-dry moisture content.

Characteristic vegetation (the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil) is listed by common name. Under *rangeland composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in the "National Range and Pasture Handbook," which is available in local offices of NRCS or on the Internet.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service, National range and pasture handbook.

Report—Rangeland Productivity and Plant Composition

Rangeland Productivity and Plant Composition– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties						
Map unit symbol and soil name	**Ecological site**	**Total dry-weight production**			**Characteristic vegetation**	**Rangeland composition**
		Favorable year	**Normal year**	**Unfavorable year**		
		Lb/ac	*Lb/ac*	*Lb/ac*		*Pct*
1—Abela gravelly loam, 2 to 8 percent slopes						
Abela	Upland Gravelly Loam (mountain Big Sagebrush)	1,000	800	400	Mountain big sagebrush	25
					Bluebunch wheatgrass	25
					Nevada bluegrass	15
					Antelope bitterbrush	10
					Miscellaneous shrubs	5
					Needleandthread	5
					Miscellaneous perennial grasses	5
					Miscellaneous perennial forbs	5
2—Abela very gravelly loam, 5 to 15 percent slopes						
Abela	—	850	650	350	Needleandthread	—
					Indian ricegrass	—
					Muttongrass	—
					Bluebunch wheatgrass	—
					Black sagebrush	—
					Miscellaneous perennial grasses	—
					Miscellaneous shrubs	—
					Longleaf hawksbeard	—
					Miscellaneous perennial forbs	—
					Mountain big sagebrush	—

Rangeland Productivity and Plant Composition– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties						
Map unit symbol and soil name	**Ecological site**	**Total dry-weight production**			**Characteristic vegetation**	**Rangeland composition**
		Favorable year	**Normal year**	**Unfavorable year**		
		Lb/ac	*Lb/ac*	*Lb/ac*		*Pct*
					Utah serviceberry	—
					Nevada jointfir	—
					Singleleaf pinyon	—
					Utah juniper	—
					Antelope bitterbrush	—
4—Amtoft-Rock outcrop complex, 30 to 70 percent slopes						
Amtoft	—	900	700	500	Miscellaneous perennial grasses	—
					Nevada bluegrass	—
					Bluebunch wheatgrass	—
					Shadscale	—
					Indian ricegrass	—
					Miscellaneous perennial forbs	—
					Black sagebrush	—
					Miscellaneous shrubs	—
					Utah juniper	—
Rock outcrop	—	—	—	—	—	—
22—Hiko Peak very stony loam, 2 to 8 percent slopes						
Hiko peak	Semidesert Stony Loam (black Sagebrush)	700	600	400	Black sagebrush	30
					Indian ricegrass	15
					Bluebunch wheatgrass	10
					Bottlebrush squirreltail	5
					Miscellaneous perennial forbs	5
					Shadscale	5

Rangeland Productivity and Plant Composition– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties						
Map unit symbol and soil name	**Ecological site**	**Total dry-weight production**			**Characteristic vegetation**	**Rangeland composition**
		Favorable year	**Normal year**	**Unfavorable year**		
		Lb/ac	*Lb/ac*	*Lb/ac*		*Pct*
					Winterfat	5
					Miscellaneous perennial grasses	5
					Miscellaneous shrubs	5
					Galleta	5
					Low rabbitbrush	5
38—Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes						
Lodar	—	700	500	200	Bluebunch wheatgrass	—
					Nevada bluegrass	—
					Indian ricegrass	—
					Bottlebrush squirreltail	—
					Miscellaneous perennial grasses	—
					Miscellaneous perennial forbs	—
					Black sagebrush	—
					Antelope bitterbrush	—
					Birchleaf mountainmahogany	—
					Miscellaneous shrubs	—
					Utah juniper	—
					Singleleaf pinyon	—
Lundy	Mountain Shallow Loam (low Sagebrush)	800	600	400	Low sagebrush	40
					Miscellaneous shrubs	15
					Bluebunch wheatgrass	15
					Muttongrass	5
					Needleandthread	5

Rangeland Productivity and Plant Composition– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties						
Map unit symbol and soil name	**Ecological site**	**Total dry-weight production**			**Characteristic vegetation**	**Rangeland composition**
		Favorable year	**Normal year**	**Unfavorable year**		
		Lb/ac	*Lb/ac*	*Lb/ac*		*Pct*
					Bottlebrush squirreltail	5
					Miscellaneous perennial grasses	5
					Miscellaneous perennial forbs	5
Rock outcrop	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties
Survey Area Data: Version 4, Dec 7, 2006

Chemical Soil Properties

This table shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced saturated hydraulic conductivity and aeration, and a general degradation of soil structure.

Report—Chemical Soil Properties

Chemical Soil Properties– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
1—Abela gravelly loam, 2 to 8 percent slopes								
Abela	0-10	10-20	—	7.9-8.4	1-15	0	0	0
	10-20	5.0-10	—	7.9-9.0	3-15	0	0	0
	20-60	5.0-10	—	8.5-9.0	25-40	0	0.0-4.0	0
2—Abela very gravelly loam, 5 to 15 percent slopes								
Abela	0-11	10-20	—	7.9-8.4	1-15	0	0	0
	11-22	5.0-10	—	7.9-9.0	3-15	0	0	0
	22-60	5.0-10	—	8.5-9.0	25-40	0	0.0-4.0	0
4—Amtoft-Rock outcrop complex, 30 to 70 percent slopes								
Amtoft	0-9	5.0-15	—	7.9-9.0	20-40	0	0.0-4.0	0
	9-16	5.0-15	—	7.9-9.0	40-80	0	0.0-4.0	0
	16-26	—	—	—	—	—	—	—
Rock outcrop	—	—	—	—	—	—	—	—
22—Hiko Peak very stony loam, 2 to 8 percent slopes								
Hiko peak	0-4	5.0-15	—	7.9-8.4	15-30	0	0.0-2.0	0-13
	4-12	5.0-10	—	7.9-9.0	15-30	0	0.0-2.0	0-13
	12-60	5.0-10	—	8.5-9.0	30-40	0	0.0-4.0	13-30

Chemical Soil Properties– Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties								
Map symbol and soil name	**Depth**	**Cation-exchange capacity**	**Effective cation-exchange capacity**	**Soil reaction**	**Calcium carbonate**	**Gypsum**	**Salinity**	**Sodium adsorption ratio**
	In	*meq/100g*	*meq/100g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
38—Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes								
Lodar	0-8	10-20	—	7.4-8.4	15-40	0	0	0
	8-16	10-15	—	7.9-9.0	40-80	0	0	0
	16-26	—	—	—	—	—	—	—
Lundy	0-11	10-20	—	7.4-8.4	3-40	0	0	0
	11-18	10-15	—	7.4-8.4	40-60	0	0	0
	18-28	—	—	—	—	—	—	—
Rock outcrop	—	—	—	—	—	—	—	—

Data Source Information

Soil Survey Area: Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties
Survey Area Data: Version 4, Dec 7, 2006

Appendix E
Other Permits

Appendix F
Surety Calculations

Bonding Calculations

Direct Costs		
Subtotal Demolition and Removal	$347,307.00	
Subtotal Backfilling and Grading	$320,843.00	
Subtotal Revegetation	$105,000.00	
Direct Costs	$773,150.00	
Indirect Costs		
Mob/Demob	$77,315.00	10.0%
Contingency	$38,658.00	5.0%
Engineering Redesign	$19,329.00	2.5%
Main Office Expense	$52,574.00	6.8%
Project Mainagement Fee	$19,329.00	2.5%
Subtotal Indirect Costs	$207,205.00	26.8%
Total Cost base on 2009 Costs	$980,355.00	
Number of years		5
Escalation factor		0.013
Escalation	$23,103.00	
Reclamation Cost Escalated	$1,003,458.00	
Bond Amount (rounded to nearest $1,000) 2014 Dollars on 95-Acres Bonded Area	$1,003,000.00	
Posted Bond		
Difference Between Cost Estimate and Bond	$0.00	
Percent Difference		

Geneva Rock Products, Inc. - N. Grantsville Quarry

Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Subtotal Cost
SUMMARY EARTHWORK															
Spread Stockpiles															$ 193,417
Replace Topsoil - Quarry Floor															$ 72,714
Replace Topsoil - Benches															$ 54,712
Total															$ 320,843

Geneva Rock Products, Inc. - N. Grantsville Quarry

Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	33% of Inventory Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
SPREAD REMAINING AGGREGATE STOCKPILES															
Road Base (1"dia.)									33,000						
Fines (0.25" dia.)									16,500						
Sub-base (3" dia.)									16,500						
Chip Rock (0.5"dia.)									9,900						
Chip Rock (0.38" dia.)									16,500						
Slurry Sand (type 1)									1,650						
Natural Fines (0.25" dia.)									16,500						
Slurry Sand (type 2)									1,650						
Drain Rock									9,900						
Basket Rock (8" dia.)									3,300						
Concrete Rock									16,500						
Course Aggregate 3/4"									16,500						
Landscape Boulders									1,650						
Concrete Sand									9,900						
Total Tons									169,950						
Total CY using 1.5 ton/LCY conversion factor									113,300						
623G EROPS (Equipment Watch 2009)	22775	$ 126.05	0.1	$ 62.15	$ 343.15	2	$ 686.30	$/HR	113,300	LCY	313	LCY/HR	362	HR	$ 124,213
14H Grader EROPS (Equipment Watch 2009)	11140	$ 55.90	0.1	$ 62.15	$ 193.27	1	$ 193.27	$/HR					181	HR	$ 34,979
5,000 Gal H2O Truck, Diesel (Equipment Watch)	2775	$ 36.65	0.1	$ 49.15	$ 106.81	1	$ 106.81	$/HR					181	HR	$ 19,331
Foreman Average, Outside					$ 66.35	1	$ 66.35	$/HR					181	HR	$ 12,009
Pickup Truck Crew 4X4 1 Ton (Equipment Watch)	755	$ 10.20	0.1	$ -	$ 15.94	1	$ 15.94	$/HR					181	HR	$ 2,885
															$ 193,417

Geneva Rock Products, Inc. - N. Grantsville Quarry

Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
REPLACE 6" TOPSOIL OVER PHASE 1 QUARRY FLOOR															
623G EROPS (Equipment Watch)	22775	$ 126.05	0.1	$ 62.15	$ 343.15	2	$ 686.30	$/HR	52,433	LCY	355	LCY/HR	129	HR	44,095
14H Grader EROPS (Equipment Watch 2009)	11140	$ 55.90	0.1	$ 62.15	$ 193.27	1	$ 193.27	$/HR					64	HR	12,417
5,000 Gal H2O Truck Diesel (Equipment Watch)	2775	$ 36.65	0.1	$ 49.15	$ 106.81	1	$ 106.81	$/HR					64	HR	6,862
Foreman Average, Outside					$ 66.35	1	$ 66.35	$/HR					64	HR	4,263
Pickup Truck Crew 4X2 (Equipment Watch)	755	$ 10.20	0.1	$ -	$ 15.94	1	$ 15.94	$/HR					64	HR	1,024
SCARIFYING															
14H Grader EROPS (Equipment Watch 2009)	11140	$ 55.90	0.1	$ 62.15	$ 193.27	1	$ 193.27	$/HR	65	ACRES	3.1	ACRE/HR	21	HR	4,052
															72,714

Geneva Rock Products, Inc. - N. Grantsville Quarry

Earthwork Costs

	Equipment Cost	Hourly Operating Costs	Equipment Overhead	Operator's Hourly Wage Rate	Hourly Cost	Number of Men or Eq.	Total Eq. & Lab. Costs	Units	Quantity	Units	Production Rate	Units	Equip. + Labor Time/Dis.	Units	Cost
REPLACE 6" TOPSOIL OVER PHASE 1 BENCH AREAS															
623G EROPS (Equipment Watch)	22775	$ 126.05	0.1	$ 62.15	$ 343.15	2	$ 686.30	$/HR	15,327	LCY	153	LCY/HR	100	HR	34,375
14H Grader EROPS (Equipment Watch 2009)	11140	$ 55.90	0.1	$ 62.15	$ 193.27	1	$ 193.27	$/HR					50	HR	9,680
5,000 Gal H2O Truck Diesel (Equipment Watch)	2775	$ 36.65	0.1	$ 49.15	$ 106.81	1	$ 106.81	$/HR					50	HR	5,350
Foreman Average, Outside					$ 66.35	1	$ 66.35	$/HR					50	HR	3,323
Pickup Truck Crew 4X2 (Equipment Watch)	755	$ 10.20	0.1	$ -	$ 15.94	1	$ 15.94	$/HR					50	HR	798
SCARIFYING															
14H Grader EROPS (Equipment Watch 2009)	11140	$ 55.90	0.1	$ 62.15	$ 193.27	1	$ 193.27	$/HR	19	ACRES	3.1	ACRE/HR	6	HR	1,185
															54,712

Ref.	SUMMARY OF DEMOLITION **Description**	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	Crusher Demolition																			$ 76,831
	Wash Plant																			$ 41,031
	Concrete Plant																			$ 96,918
	Asphalt Plant Demolition																			$ 129,766
	Scale House Demolition																			$ 2,761
																				$ 347,307

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume CF	Weight	Density	Time	Number Loads	Unit	Swell Factor	Quantity	Unit	Cost
	CRUSHER																			
	Conveyors (15)	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	70.00	4.00	4.00							15	ft		16,800.00	cf	5,208
	Jaw Crusher/feeder	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	12.00	12.00							2	ft		11,520.00	cf	3,571
	3-Deck 7x20 Screen	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	10.00	12.00							4	ft		19,200.00	cf	5,952
	2- Deck 5x16 Screen	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	30.00	10.00	12.00							1	ft		3,600.00	cf	1,116
	Cone Crusher w/ Screen	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	12.00	12.00							2	ft		11,520.00	cf	3,571
	Control House/Tower	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	45.00	10.00	12.00							1	ft		5,400.00	cf	1,674
	VSI Impact Crusher	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	10.00	12.00							1	ft		4,800.00	cf	1,488
	Generator - 1000 KW	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	8.00	10.00							1	ft		3,200.00	cf	992
	Conex Parts Storage Container	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	8.00	8.00							1	ft		2,560.00	cf	794
	Wash Plant	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	12.00	12.00							1	ft		5,760.00	cf	1,786
	Misc. Pipe, legs, and Splitter	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	8.00	8.00							1	ft		2,560.00	cf	794
	39 Miles to Western Metals, SLC - 20 miles covrd																			
	Total Volume of Materials																	86,920.00	cf	
	Volume of Debris																0.3	26,076.00		
	Weight of Debris												488			lb/cf		6,363	tons	
	No. of Trip 16 Tons																	398	Trip	
	Add 1 Hr per round trip																			
	Hual to Recycling Center 1hr rnd trip	Truck Dump 16 Ton Payload	01 54 33 20 5300	$ 533.00	Day													49.71	Day	26,494
	Truck Driver	Truck driver, Heavy	Trhv	$ 49.15	HR													397.66	Hr	19,545
	Subtotal																			73,000
	Fuel Tank																			
	Removal of Storage Tanks	9000 gal to 12000 gal tank	02 65 10 30 0130	1,500	Ea.										1	Ea		1	Ea	1,500
	Remove Sludge, water remaining products	9000 gal to 12000 gal tank	02 65 10 30 0130	435	Ea.										1	Ea		1	Ea	435
	haul tank 100 miles round trip	9000 gal to 12000 gal tank	02 65 10 30 0130	1,276	Ea.										1	Ea		1	Ea	1,276
	Subtotal																			3,211
	Demolition Cost Structures Disposed on Site																			
	Truck Scales	Steel Bldg. Large	02 41 16 13 0020	0.31	/CF	100	10	2								ft		2000	cf	620
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			620
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			76,831

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume CF	Weight	Density	Time	Number Loads	Unit	Swell Factor	Quantity	Unit	Cost
	WASH PLANT																			
	Feeder	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	60.00	10.00	12.00							1	ft		7,200.00	cf	2,232
	Wash Screen	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	12.00	12.00							1	ft		5,760.00	cf	1,786
	Twin Sand Screws	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	12.00	12.00							1	ft		5,760.00	cf	1,786
	Conveyors (3)	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	80.00	4.00	4.00							3	ft		3,840.00	cf	1,190
	Clarifier	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	12.00	12.00							1	ft		5,760.00	cf	1,786
	Control House	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	45.00	10.00	10.00							1	ft		4,500.00	cf	1,395
	VSI Impact Crusher	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	10.00	12.00							1	ft		4,800.00	cf	1,488
	Generator - 300 KW	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	20.00	8.00	10.00							1	ft		1,600.00	cf	496
	Conex Parts Storage Container	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	8.00	8.00							1	ft		2,560.00	cf	794
	Misc. Pipe, and Legs	**Steel Bldg. Large**	02 41 16.13 0020	**0.31**	**/CF**	40.00	8.00	8.00							1	ft		2,560.00	cf	794
	39 Miles to Western Metals, SLC - 20 miles covrd																			
	Total Volume of Materials																	44,340.00	cf	
	Volume of Debris																0.3	13,302.00		
	Weight of Debris												488			lb/cf		3,246	tons	
	No. of Trip 16 Tons																	203	Trip	
	Add 1 Hr per round trip																			
	Hual to Recycling Center 1hr md trip	Truck Dump 16 Ton Payload	01 54 33 20 5300	$ 533.00	Day													25.36	Day	13,515
	Truck Driver	Truck driver, Heavy	Trhv	$ 49.15	HR													202.86	Hr	9,970
	Subtotal																			37,200
	Fuel Tank																			
	Removal of Storage Tanks	9000 gal to 12000 gal tank	02 65 10 30 0130	1,500	Ea.										1	Ea		1	Ea	1,500
	Remove Sludge, water remaining products	9000 gal to 12000 gal tank	02 65 10 30 0130	435	Ea.										1	Ea		1	Ea	435
	haul tank 100 miles round trip	9000 gal to 12000 gal tank	02 65 10 30 0130	1,276	Ea.										1	Ea		1	Ea	1,276
	Subtotal																			3,211
	Demolition Cost Structures Disposed on Site																			
	Truck Scales	Steel Bldg. Large	02 41 16 13 0020	0.31	/CF	100	10	2								ft		2000	cf	620
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			620
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			41,031

Geneva Rock Products, Inc. - N. Grantsville Quarry

Demolition Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume CF	Weight	Density	Time	Number Loads	Unit	Swell Factor	Quantity	Unit	Cost
	Demolition Cost Structure to be Removed																			
	CONCRETE PLANT																			
	Control House/Switch Van	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	45.00	12.00	10.00							1			5,400	cf	1,674
	Batcher/Bins	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	100.00	12.00	12.00							1			14,400	cf	4,464
	Cement Silo	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	100.00	12.00	12.00							1			14,400	cf	4,464
	Fly Ash Silo	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	50.00	12.00	12.00							1			7,200	cf	2,232
	Feeder	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	90.00	10.00	14.00							1			12,600	cf	3,906
	Conveyors(3)	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	90.00	12.00	12.00							2	Gal		25,920	cf	8,035
	Conex Parts Storage Container	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	30.00	8.00	8.00							2	Gal		3,840	cf	1,190
	Generator	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	80.00	12.00	12.00							1			11,520	cf	3,571
	Water Tank/Heater	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	80.00	12.00	12.00							1			11,520	cf	3,571
	Misc. Pipe, legs, Augers, Ducts	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	10.00	12.00							1			4,800	cf	1,488
	39 Miles to Western Metals, SLC - 20 miles covrd																			
	Total Volume of Materials																	111,600		
	Volume of Debris																0.3	33,480		
	Weight of Debris												488			lb/cf		8,169		
	No. of Trip 16 Tons																	511		
	Add 1 Hr per round trip																			
	Hual to Recycling Center 1hr rnd trip		01 54 33 20 5300	$ 533.00	/day									0		hr/trip		64	Day	34,017
	Truck Driver	Truck Driver, Heavy	Trhv	$ 49.15	Hr													511	Hr	25,095
	Subtotal																			93,707
	Fuel Tank																			
	Removal of Storage Tanks	9000 gal to 12,000gal tank	02 65 10 30 0130	1500	Ea.										1	Ea.		1	Ea.	1,500
	Remove Sludge, Water, Remaining Products	9000 gal to 12,000gal tank	02 65 10 30 0130	435	Ea.										1	Ea.		1	Ea.	435
	Haul Tank 100 miles round trip	9000 gal to 12,000gal tank	02 65 10 30 0130	1276	Ea.										1	Ea.		1	Ea.	1,276
	Subtotal																			3,211
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			96,918

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume CF	Weight	Density	Time	Number Loads	Unit	Swell Factor	Quantity	Unit	Cost
	Demolition Cost Structure to be Removed																			
	ASPHALT PLANT																			
	Control House/Switch Van	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	45.00	12.00	10.00							1			5,400	cf	1,674
	Asphalt Drum Dryer	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	100.00	12.00	12.00							1			14,400	cf	4,464
	Bag House	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	100.00	12.00	12.00							1			14,400	cf	4,464
	Primary Dust Collector	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	50.00	12.00	12.00							1			7,200	cf	2,232
	Cold Feed Feeder Bins	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	90.00	10.00	14.00							1			12,600	cf	3,906
	Asphalt Tanks 30,000 gal (2)	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	90.00	12.00	12.00							2	Gal		25,920	cf	8,035
	Asphatl Tanks 10,000 gal (2)	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	30.00	8.00	8.00							2	Gal		3,840	cf	1,190
	Lime Silo	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	80.00	12.00	12.00							1			11,520	cf	3,571
	Lime Guppy	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	80.00	12.00	12.00							1			11,520	cf	3,571
	Control House	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	10.00	12.00							1			4,800	cf	1,488
	Rap Feeder Bins	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	11.00	14.00							1			6,160	cf	1,910
	Conveyors (3)	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	80.00	4.00	4.00							1			1,280	cf	397
	Pugmill	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	8.00	10.00							3			9,600	cf	2,976
	Hot Storage Silo	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	100.00	12.00	12.00							1			14,400	cf	4,464
	Generator (1,000 KW)	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	8.00	8.00							1			2,560	cf	794
	Conex Parts Storage Container	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	8.00	8.00							1			2,560	cf	794
	Misc. Pipe, legs, Augers, Ducts	**Steel Bldg. Large**	02 41 16 13 0020	0.31	/CF	40.00	8.00	8.00							1			2,560	cf	794
	39 Miles to Western Metals, SLC - 20 miles covrd																			
	Total Volume of Materials																	150,720		
	Volume of Debris																0.3	45,216		
	Weight of Debris												488			lb/cf		11,033		
	No. of Trip 16 Tons																	690		
	Add 1 Hr per round trip																			
	Hual to Recycling Center 1hr rnd trip		01 54 33 20 5300	$ 533.00	/day									0		hr/trip		86	Day	45,941
	Truck Driver	Truck Driver, Heavy	Trhv	$ 49.15	Hr													690	Hr	33,891
	Subtotal																			126,555
	Fuel Tank																			
	Removal of Storage Tanks	9000 gal to 12,000gal tank	02 65 10 30 0130	1500	Ea.										1	Ea.		1	Ea.	1,500
	Remove Sludge, Water, Remaining Products	9000 gal to 12,000gal tank	02 65 10 30 0130	435	Ea.										1	Ea.		1	Ea.	435
	Haul Tank 100 miles round trip	9000 gal to 12,000gal tank	02 65 10 30 0130	1276	Ea.										1	Ea.		1	Ea.	1,276
	Subtotal																			3,211
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			129,766

Ref.	Description	Materials	Means Reference Number	Unit Cost	/Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	SCALE HOUSE & SCALE FOOTINGS																			
	Deduct 50% no interior walls																			
	Structure's Demolition Cost	Mixed Materials Bldg. Large	02 41 16.13 0100	$ 0.33	CF	40	10	10			4000							4000	CF	$ 1,320
	Structure's Vol. Demolished																			
	Rubble's Weight (exclude steel)																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Non Steel Truck	Truck Dump 16 ton payload	01 54 33.20 5300	$ 533.00	/day									0		day/trip		0	day	$ -
	Transportation Cost Non Steel Drive																	0	hr	$ -
	Disposal Cost Non Steel	T. Co. Solid Waste Mgmt. Facility- 20 miles	TCSWMF	$ 23.00	Ton													60	Ton	$ 1,380
	Steel's Weight																			
	Truck's Capacity																			
	Haulage																			
	Transportation Cost Steel Truck																			
	Transportation Cost Steel Truck Drive																			
	Disposal Cost Steel																			
	Subtotal																			$ 2,700
	Equipment 's Disposal Cost																			
	Dismantling Cost																			
	Equipment 's Vol. Demolished																			
	Loading Costs																			
	Transport Costs																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost	Concrete Demolition Cost	Concrete Demo1	$ 11.03	CY	12	4	1								ft		2	CY	$ 22
	Concrete's Vol. Demolished																1.3	3	CY	
	Loading Cost	Front end loader wheel 3 cy	31 23 16 42 1601	1.01	CY													3	CY	$ 3
	Transportation Cost	12CY (16 ton) Dumpl Truck 1/2mi. Md. Trip	31 23 23 20 0320	$ 2.92	CY													3	CY	$ 9
	Disposal Costs	Disposal on site	02 41 16 17 4200	$ 9.00	/CF							0						3	CY	$ 27
	Subtotal																			$ 61
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Concrete Demolition																			
	Demolition Cost																			
	Concrete's Vol. Demolished																			
	Loading Cost																			
	Transportation Cost																			
	Disposal Costs																			
	Subtotal																			
	Total																			$ 2,761

Geneva Rock Products, Inc. - N. Grantsville Quarry

Revegetation Costs

Ref.	Description	Materials	Means Reference Number	Unit Cost	Unit	Length	Width	Height	Diameter	Area	Volume	Weight	Density	Time	Number	Unit	Swell Factor	Quantity	Unit	Cost
	REVEGETATION COST - ENTIRE MINE																			
	Seeding Costs	Standard Vegetation Costs	Min STD Veg	$1,000	/Acre					84										$ 84,000
	Reseeding - assume 25%	Standard Vegetation Costs	Min STD Veg	$1,000	/Acre					21										$ 21,000
	Subtotal																			$ 105,000
	Subtotal																			
	Subtotal																			
	Subtotal																			
	Subtotal																			
	Total																			$ 105,000

EQUIPMENT WATCH

Friday, Apr 3, 2009

Caterpillar 623G
Single Engine Elevating Scrapers

Size Class:
Heaped Capacity - Cubic Yds: 18 & Under 30CY
Weight:
82,530 lbs.

Compare Similar Models | Add To My Fleets

Configuration for 623G

Power Mode:	**Diesel**	Scraper Capacity:	**18.0 - 23.0 cy**
Net Horsepower:	**365.0**	Operator Protection:	**EROPS**

Manufacturer Notes: C-H = Cushion-Hitch

Blue Book Rates

Rate Effective Dates: Always Use Current Rate

	Ownership Costs				Estimated Operating Costs	FHWA Rate
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	$22,775.00	$6,375.00	$1,595.00	$240.00	$126.05	$255.45
Adjustments						
Region (Utah: 86.5%)	-$3,074.62	-$860.62	-$215.32	-$32.40		
Model Year (100%)	-	-	-	-		
Ownership (100%)	-	-	-	-		
Operating (100%)						
Total:	**$19,700.38**	**$5,514.38**	**$1,379.68**	**$207.60**	**$126.05**	**$237.98**

For details, see Rate Element Allocation

Adjustments

Default Settings

Model Year: Please Select

Region: Utah
Canadian Regions | Alaskan Regions

User Defined

Ownership: %

Operating: %

Adjust Rates

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	29%	$6,604.75 / mo
Overhaul (ownership)	49%	$11,159.75 / mo
CFC (ownership)	12%	$2,733.00 / mo
Indirect (ownership)	10%	$2,277.50 / mo
Fuel (operating) @ $3.96	44%	$54.93 / hr

Revised Date: 2nd Half 2008

Email : customerservice@equipmentwatch.com
Version: 3.2.12A

EQUIPMENT WATCH

Friday, Apr 3, 2009

On-Highway Light Duty Trucks
Miscellaneous Models

Add To My Fleets +

Configuration for On-Highway Light Duty Trucks

Power Mode:	**Diesel**	Cab Type:	**Conventional**
Axle Configuration:	**4X2**	Ton Rating:	**3/4**
Horsepower:	**160.0**		

Blue Book Rates

Rate Effective Dates: Always Use Current Rate

	Ownership Costs				Estimated Operating Costs	FHWA Rate
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	$755.00	$210.00	$53.00	$8.00	$10.20	$14.49
Adjustments						
Region (Utah: 89.8%)	-$77.01	-$21.42	-$5.41	-$0.82		
Model Year (100%)	-	-	-	-		
Ownership (100%)	-	-	-	-		
Operating (100%)					-	
Total:	**$677.99**	**$188.58**	**$47.59**	**$7.18**	**$10.20**	**$14.05**

For details, see Rate Element Allocation

Adjustments

Default Settings

Model Year: Please Select

Region: Utah

Canadian Regions Alaskan Regions

User Defined

Ownership: %

Operating: %

Adjust Rates

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	56%	$422.80 / mo
Overhaul (ownership)	25%	$188.75 / mo
CFC (ownership)	9%	$67.95 / mo
Indirect (ownership)	10%	$75.50 / mo
Fuel (operating) @ $3.96	75%	$7.60 / hr

Revised Date: 2nd Half 2008

Email : customerservice@equipmentwatch.com
Version: 3.2.12A

EQUIPMENT WATCH.

Friday, Apr 3, 2009

On-Highway Water Tankers

Miscellaneous Models

Add To My Fleets

Configuration for On-Highway Water Tankers

Power Mode:	**Diesel**	Tank Capacity:	**3,500 gal**
Horsepower:	**250.0**		

Equipment Notes: Rates include pump and rear spray system.

Blue Book Rates

Rate Effective Dates: ☐ Always Use Current Rate

	Ownership Costs				Estimated Operating Costs	FHWA Rate
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	$2,775.00	$775.00	$195.00	$29.00	$36.65	$52.42
Adjustments						
Region (Utah: 89.8%)	-$283.05	-$79.05	-$19.89	-$2.96		
Model Year (100%)	-	-	-	-		
Ownership (100%)	-	-	-	-		
Operating (100%)					-	
Total:	**$2,491.95**	**$695.95**	**$175.11**	**$26.04**	**$36.65**	**$50.81**

For details, see Rate Element Allocation

Adjustments

Default Settings

Model Year: Please Select

Region: Utah

Canadian Regions Alaskan Regions

User Defined

Ownership: %

Operating: %

Adjust Rates

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	52%	$1,443.00 / mo
Overhaul (ownership)	24%	$666.00 / mo
CFC (ownership)	12%	$333.00 / mo
Indirect (ownership)	12%	$333.00 / mo
Fuel (operating) @ $3.96	68%	$24.75 / hr

Revised Date: 2nd Half 2008

Email : customerservice@equipmentwatch.com
Version: 3.2.12A

Project: N Guntsville Quarry
Date: 9/24/09
Prepared by: B. Swinson

WORKSHEET 12
PRODUCTIVITY AND HOURS REQUIRED FOR MOTORGRADER USE

Earthmoving Activity: Scarifying Roads, Plant & Stockpile Area

Characterization of Grader Used (type, size capacity, etc.):
Cat 14 H 14' Wide Blade, Ripper Bean Width 8'6" Wide

Description of Grader Route (push distance, grade, effective blade width, operating speed, etc.):
65 Acres to Scarify

Productivity Calculations:

Grading

Hourly Production = _____ (average speed) mi/hr x _____ (effective blade width) ft x 5,280 ft/mi x 1 ac/43,560 ft²

x _____ (efficiency factor) = _____ ac/hr

Hours Required = _____ (area to be graded) ac ÷ _____ (hourly production) ac/hr = _____ hr

Scarification

Hourly Production = 4 (average speed) mi/hr x 8.5 (scarifier width) ft x 5,280 ft/mi x 1 ac/43,560 ft²

x .75 (efficiency factor) = 3.1 ac/hr 65/3.1 = 20.96

Hours Required = _____ (area to be scarified) ac ÷ _____ (hourly production) ac/hr = _____ hr

Total Hours Required

Total Hours = _____ (grading hours required) + _____ (scarification hours required) = _____ hr

Data Source(s):

Project: N Grantsville Quarry
Date: 9/21/09
Prepared by: B. Summerhays

WORKSHEET 12
PRODUCTIVITY AND HOURS REQUIRED FOR MOTORGRADER USE

Earthmoving Activity: Knocking Down for Scrapers

Characterization of Grader Used (type, size capacity, etc.):
Cat 14H Grader, Blade Length 14'

Description of Grader Route (push distance, grade, effective blade width, operating speed, etc.):

Productivity Calculations:

Grading

Hourly Production = 3.50 (average speed) mi/hr x 12.12 @ 20° (effective blade width) ft x 5,280 ft/mi x 1 ac/43,560 ft²

x .75 (efficiency factor) = 5.14 ac/hr

Hours Required = _____ (area to be graded) ac ÷ _____ (hourly production) ac/hr = _____ hr

Scarification

Hourly Production = _____ (average speed) mi/hr x _____ (scarifier width) ft x 5,280 ft/mi x 1 ac/43,560 ft²

x _____ (efficiency factor) = _____ ac/hr

Hours Required = _____ (area to be scarified) ac ÷ _____ (hourly production) ac/hr = _____ hr

Total Hours Required

Total Hours = _____ (grading hours required) + _____ (scarification hours required) = _____ hr

Data Source(s):

Project: N. Grantsville Quarry
Date: Sept. 21, 09
Prepared by: B. Summsion

WORKSHEET 11A
PRODUCTIVITY OF PUSH-PULL OR SELF-LOADING SCRAPER USE

Earthmoving Activity:
Redistribution of Topsoil on Quarry Floor

Characterization of Scraper Used (type, capacity, etc.):
Cat 623G Self Loading Scraper

Description of Scraper Use (origin, destination, grade, haul distance, capacity, etc.):
Origin - Topsoil Stockpiles Dest. - Quarry Floor
Cap. 23 cy heaped Haul Dist. 1,000'

Productivity Calculations:

Cycle Time = .90 min (load time (push-pull is per pair)) + .6 min (loaded trip time) + .70 min (maneuver and spread time) + .4 min (return trip time) = 2.6 min (push-pull is per pair)

Hourly Production = 20.5 LCY (capacity *) x 60 min/hr ÷ 2.60 min (cycle time) x .75 (efficiency factor) = 355 LCY/hr (push-pull is per pair)

Hours Required = _____ LCY (volume to be handled) ÷ _____ LCY/hr (net hourly production) = _____ hr

* The average of the struck and heaped capacities; use total for two scrapers for push-pull.

Data Source(s):

Project: N Grantsville Quarry
Date: 9/21/09
Prepared by: B. Samsion

WORKSHEET 11A
PRODUCTIVITY OF PUSH-PULL OR SELF-LOADING SCRAPER USE

Earthmoving Activity: Redistribution of Topsoil on Benches

Characterization of Scraper Used (type, capacity, etc.):

Cat 623G

Description of Scraper Use (origin, destination, grade, haul distance, capacity, etc.):

Origin - Topsoil Stockpile Dest. - Quarry Benches, Grade 3%
Dist. - 6,700'

Productivity Calculations:

Cycle Time = .90 (load time (push-pull is per pair)) min + 3.25 (loaded trip time) min + .70 (maneuver and spread time) min + 2.6 (return trip time) min = 7.45 (push-pull is per pair) min

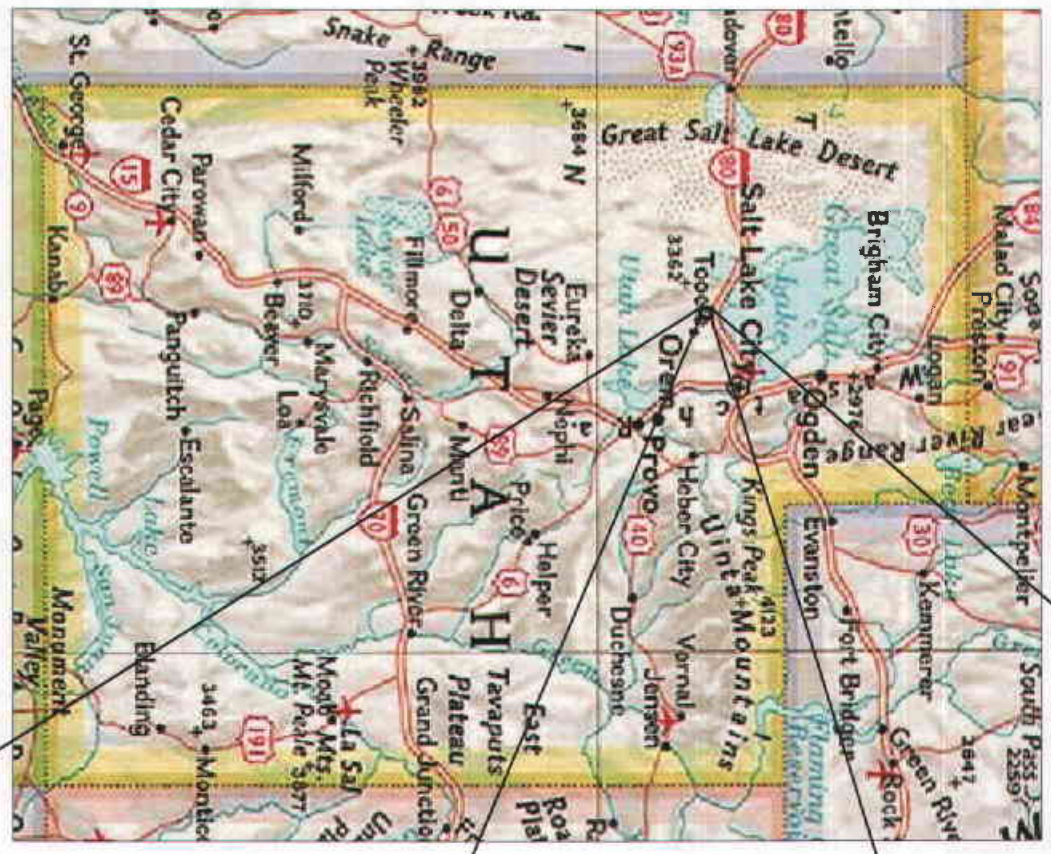
Hourly Production = 20.5 (capacity*) LCY x 60 min/hr ÷ 7.45 (cycle time) min x .75 (efficiency factor) = 153 (push-pull is per pair) LCY/hr

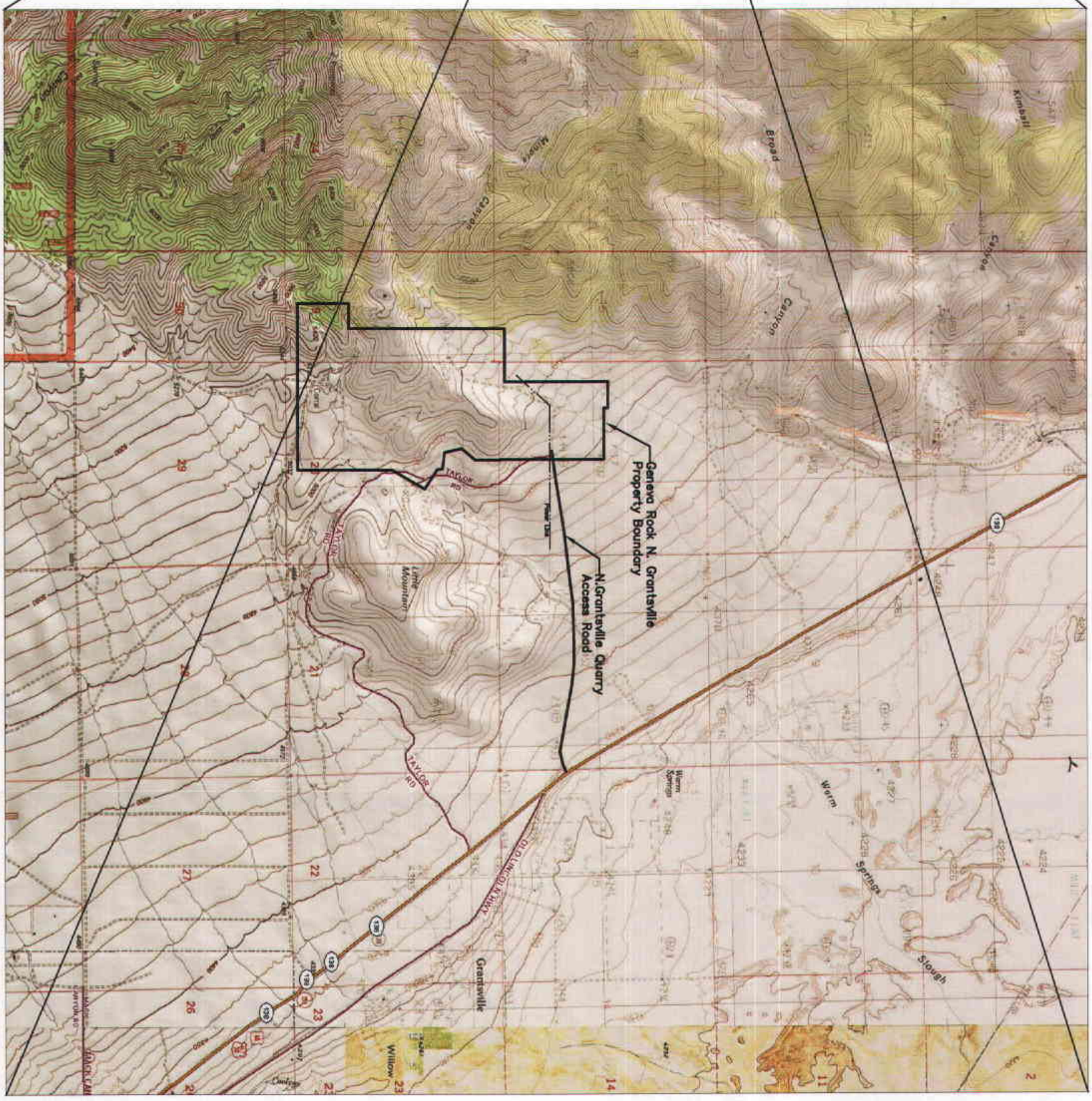
Hours Required = 15,321 (volume to be handled) LCY ÷ 153 (net hourly production) LCY/hr = 100 hr

* The average of the struck and heaped capacities; use total for two scrapers for push-pull.

Data Source(s):

SCALE: 1" = 3000'

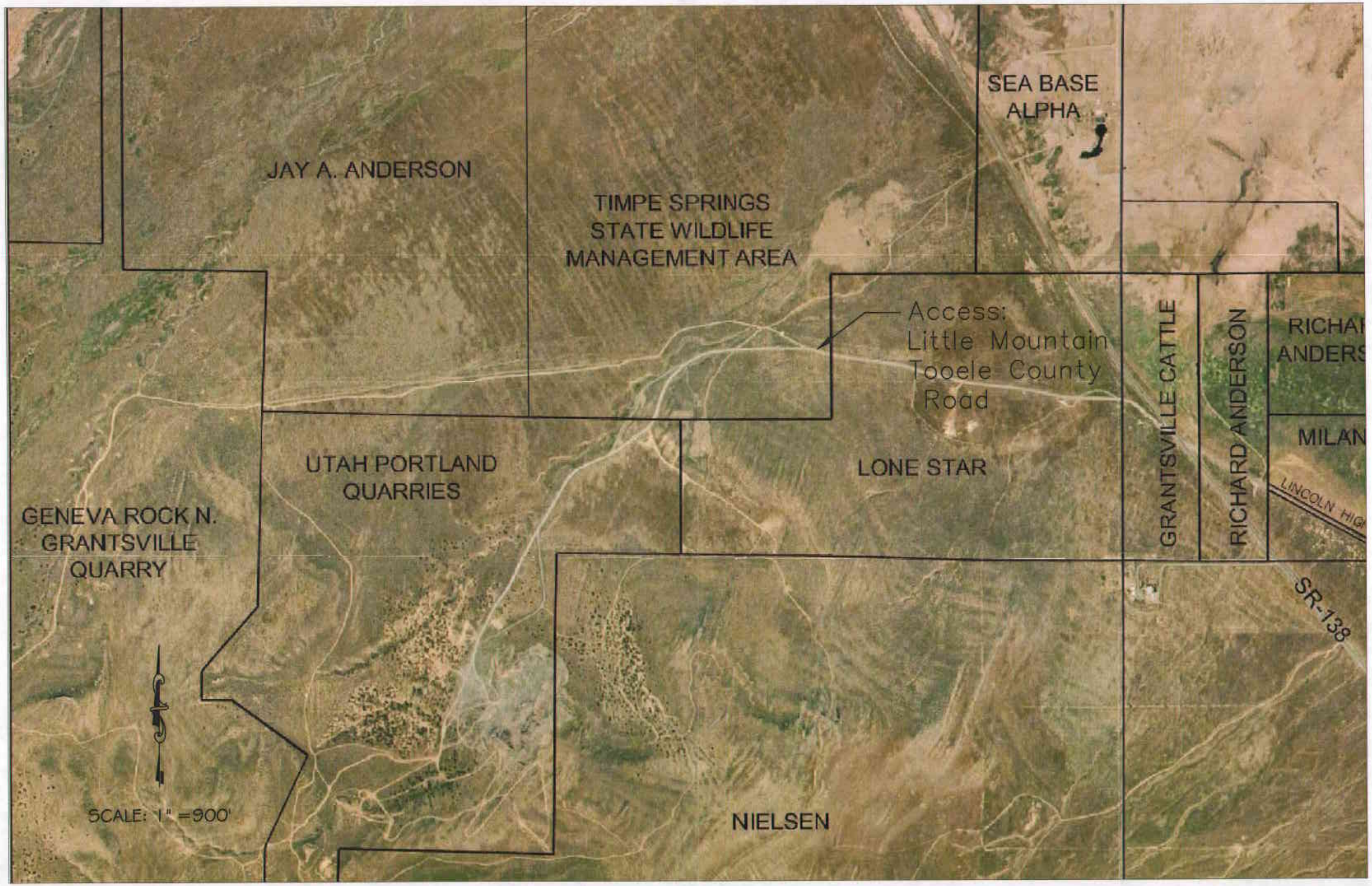




Drawn: B SUMSION	TITLE: N. Grantsville Quarry Base Unit Map		Engineer:				
Checked: BS /AS/CC							
Approved:							
Date: 8-18-09	ISSUED FOR INTERNAL REVIEW	Revision:					
Dwg. No. CCI-1		00		NO.	DATE:	DESCRIPTION:	BY:

Geneva Rock
NOI N. Grantsville Quarry
Figure 1

Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800



Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800

Geneva Rock
NOI N. Grantsville Quarry
Figure 2

NO.	DATE:	DESCRIPTION:	BY:

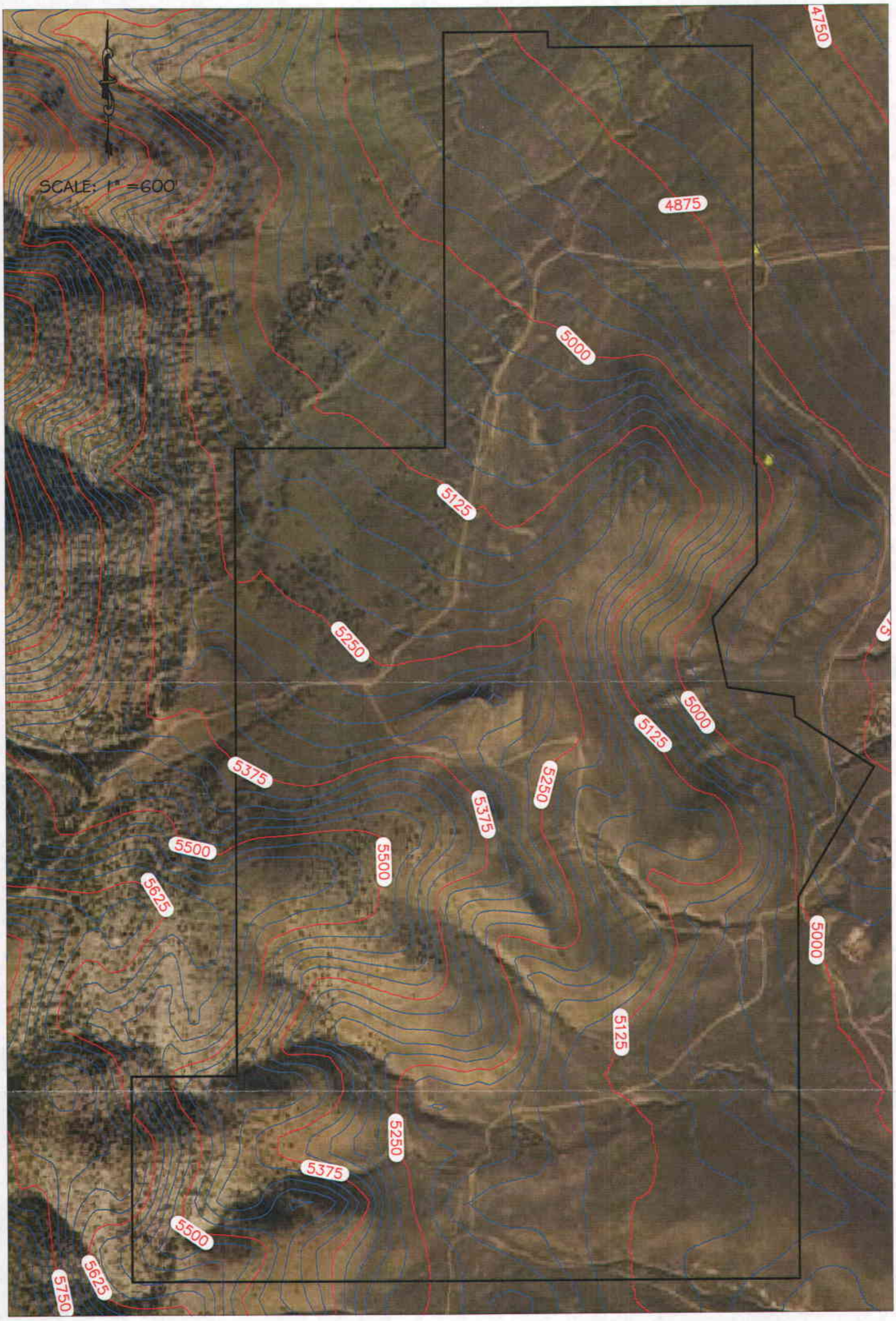
Engineer:

TITLE: N. Grantsville Quarry
Adjacent Land Owners

Revisions:
00

ISSUED FOR INTERNAL REVIEW

Drawn: B SLAUGH
Checked: BS/CC
Approved:
Date: 8-27-09
Dwg. No. CC3-4



Drawn: B SUMSION	TITLE: N. Grantsville Quarry Existing Contours	Engineer:					Geneva Rock NOI N. Grantsville Quarry Figure 3
Checked: BS /AS/CC							
Approved:							
Date: 8-18-09	ISSUED FOR INTERNAL REVIEW	Revision: 00					
Dwg. No. CCI-1			NO.	DATE:	DESCRIPTION:	BY:	

Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800

Drawn: B SUMSION	TITLE: N. Grantsville Quarry Mine Plan		Engineer:					Geneva Rock NOI N. Grantsville Quarry Figure 4
Checked: BS/CC								
Approved:								
Date: 8-27-09	ISSUED FOR INTERNAL REVIEW	Revision:		NO.	DATE:	DESCRIPTION:	BY:	
Dwg. No. CCI-4		00						

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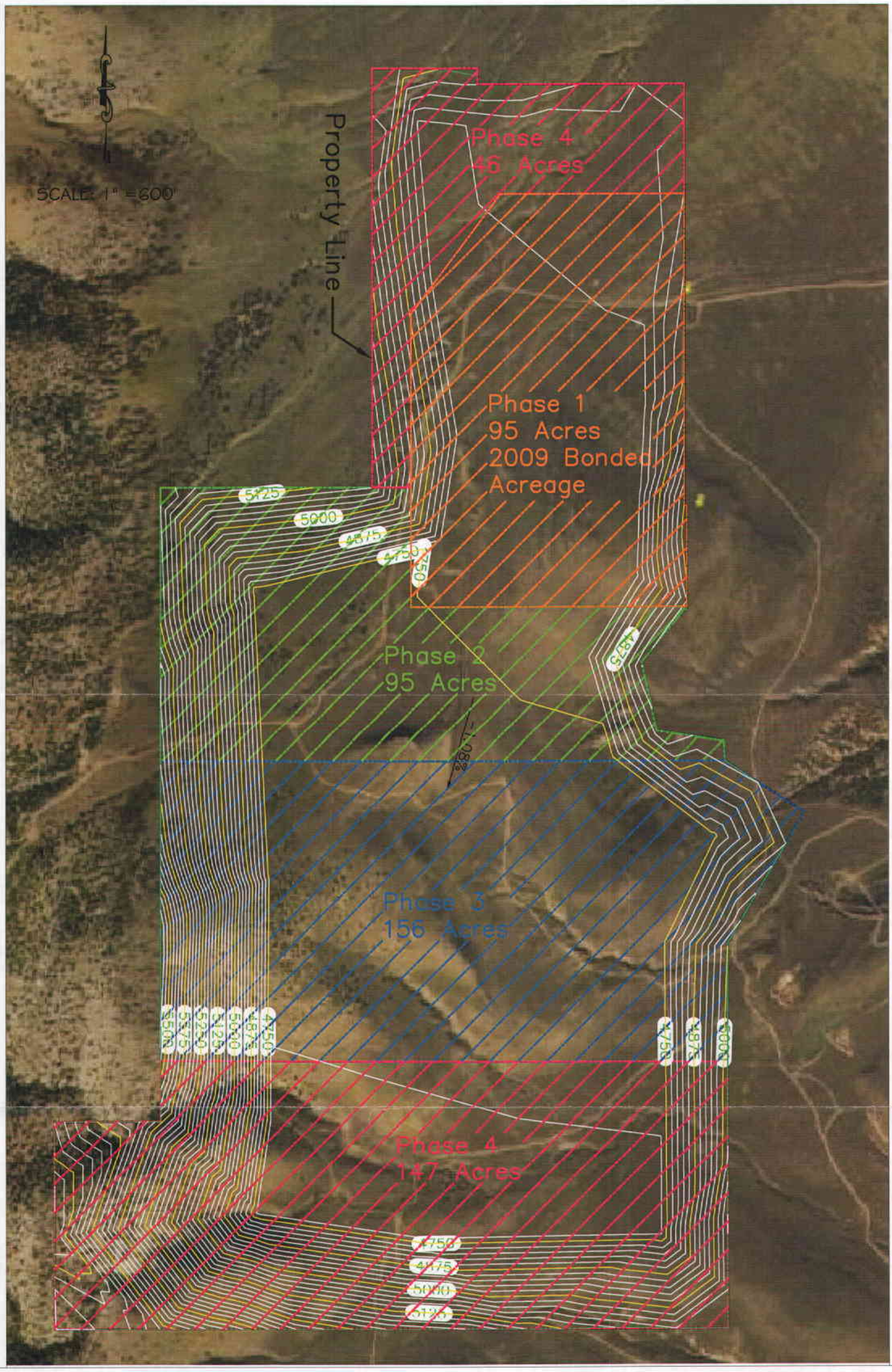

Drawn: B SUMSION	TITLE: N. Grantsville Quarry Mine Phasing Map	Engineer:					Geneva Rock NOI N. Grantsville Quarry Figure 4a
Checked: BS /AS/CC							
Approved:							
Date: 8-27-09	ISSUED FOR INTERNAL REVIEW — Revision: 00		NO.	DATE:	DESCRIPTION:	BY:	
Dwg. No. CCI-1							

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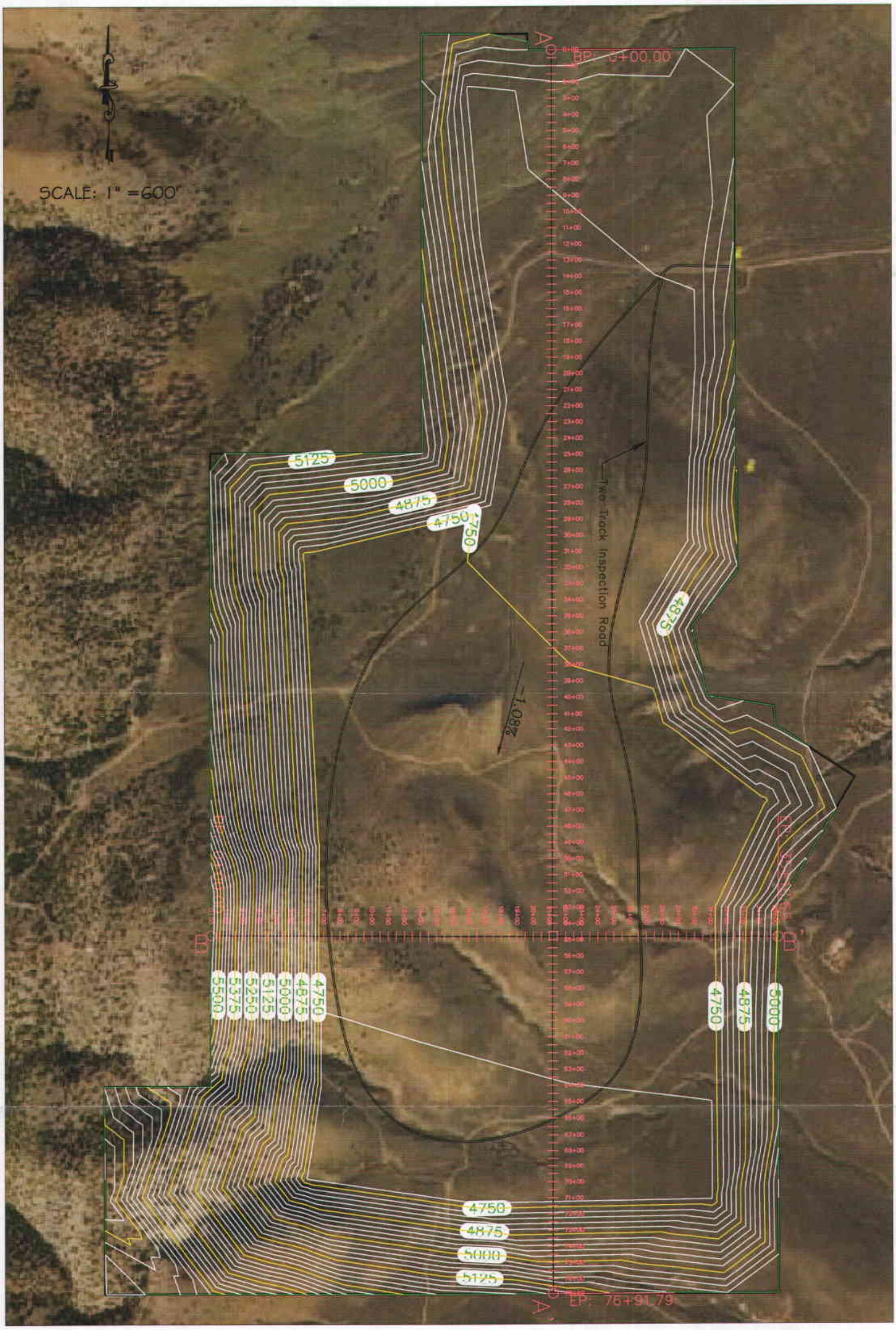
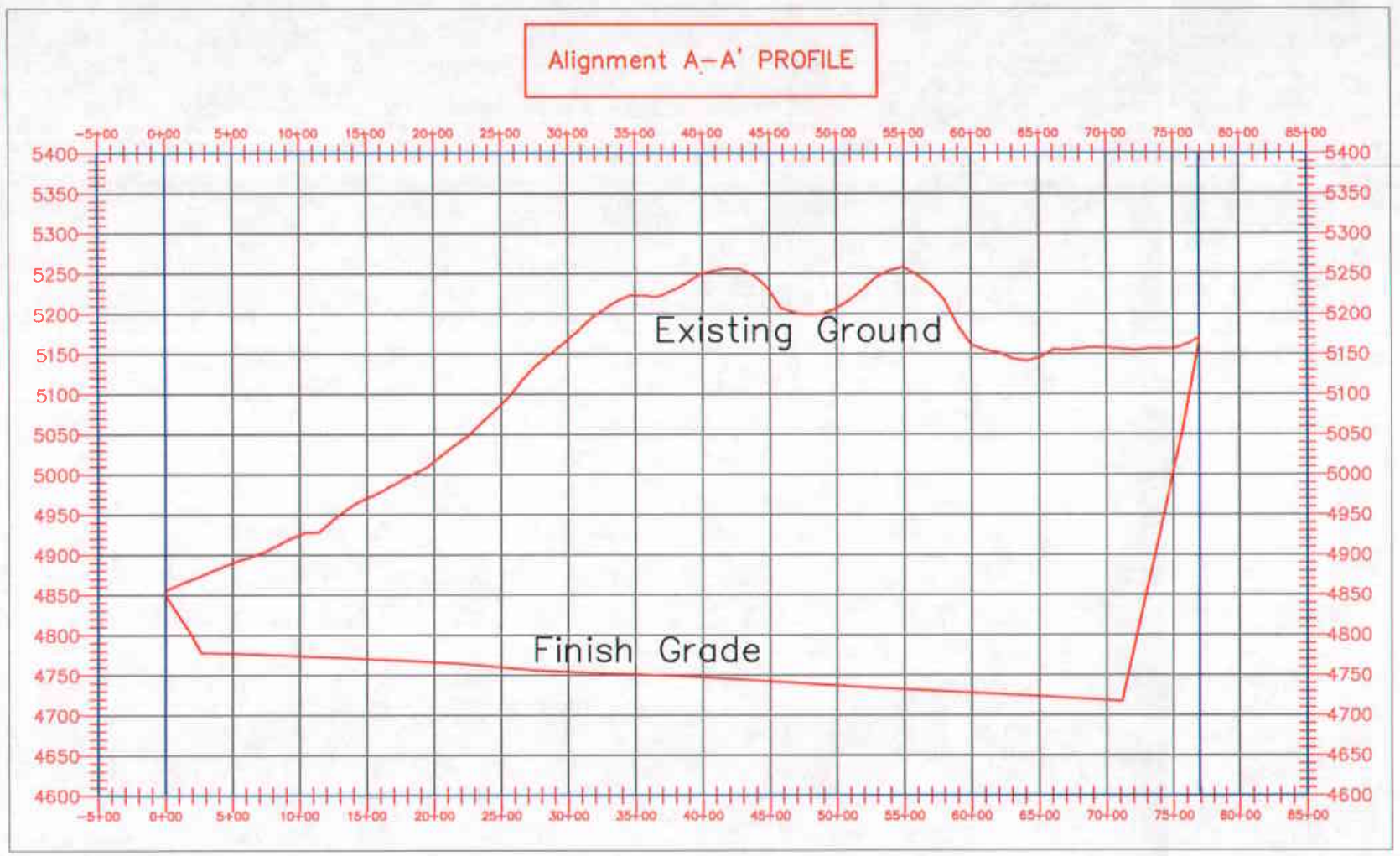
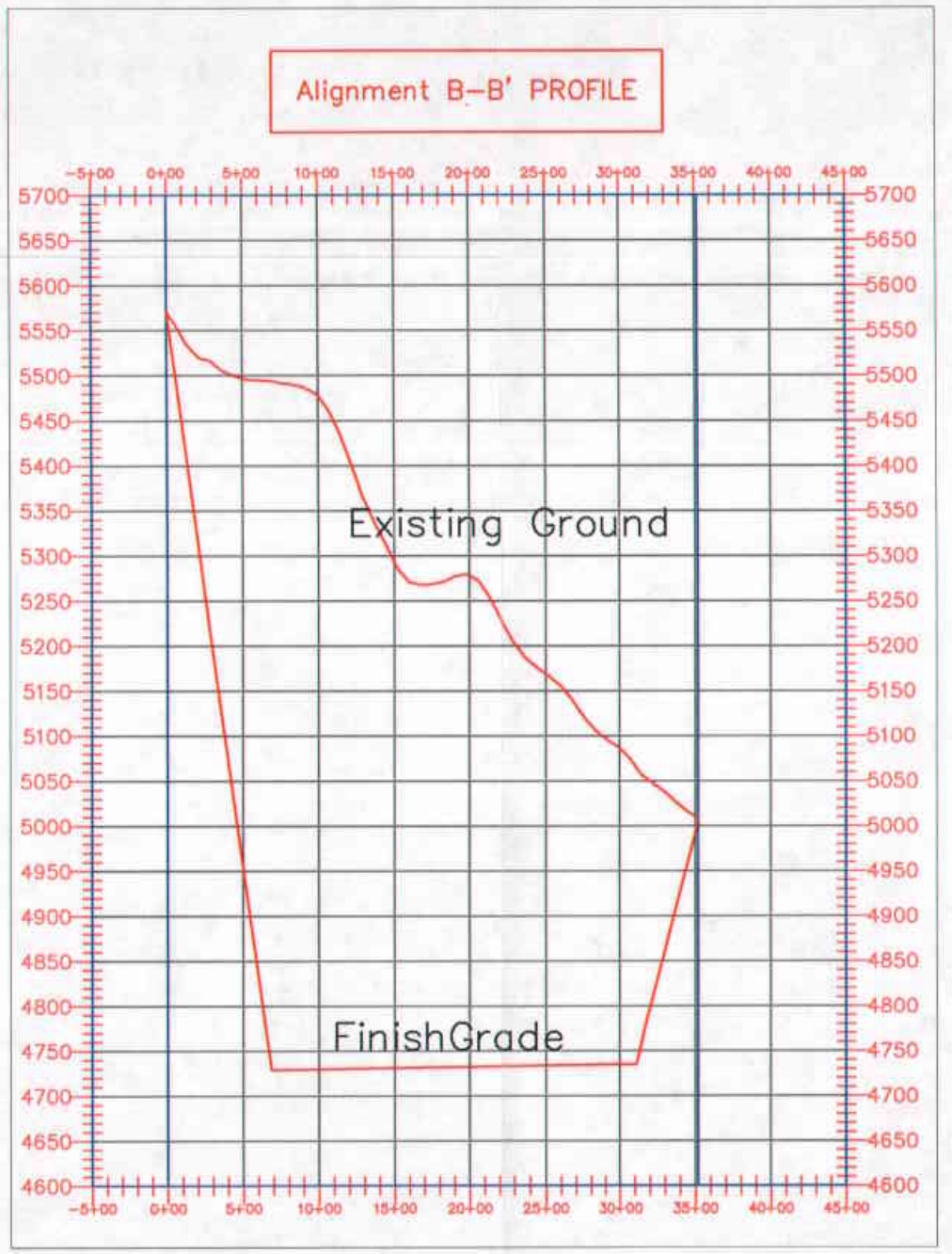
1556 West 400 North
Orem, Utah 84057
801-765-7800



Drawn: B SUMSION	TITLE: N. Grantsville Quarry Reclamation Plan		Engineer:					Geneva Rock NOI N. Grantsville Quarry Figure 5
Checked: BS/CC								
Approved:								
Date: 8-27-09	ISSUED FOR INTERNAL REVIEW	Revision: 00		NO.	DATE:	DESCRIPTION:	BY:	
Dwg. No. CCI-5								

Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800





Final Buildout Profile Sections

Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800

Geneva Rock
NOI N. Grantsville Quarry
Figure 6

NO.	DATE:	DESCRIPTION:

Engineer:

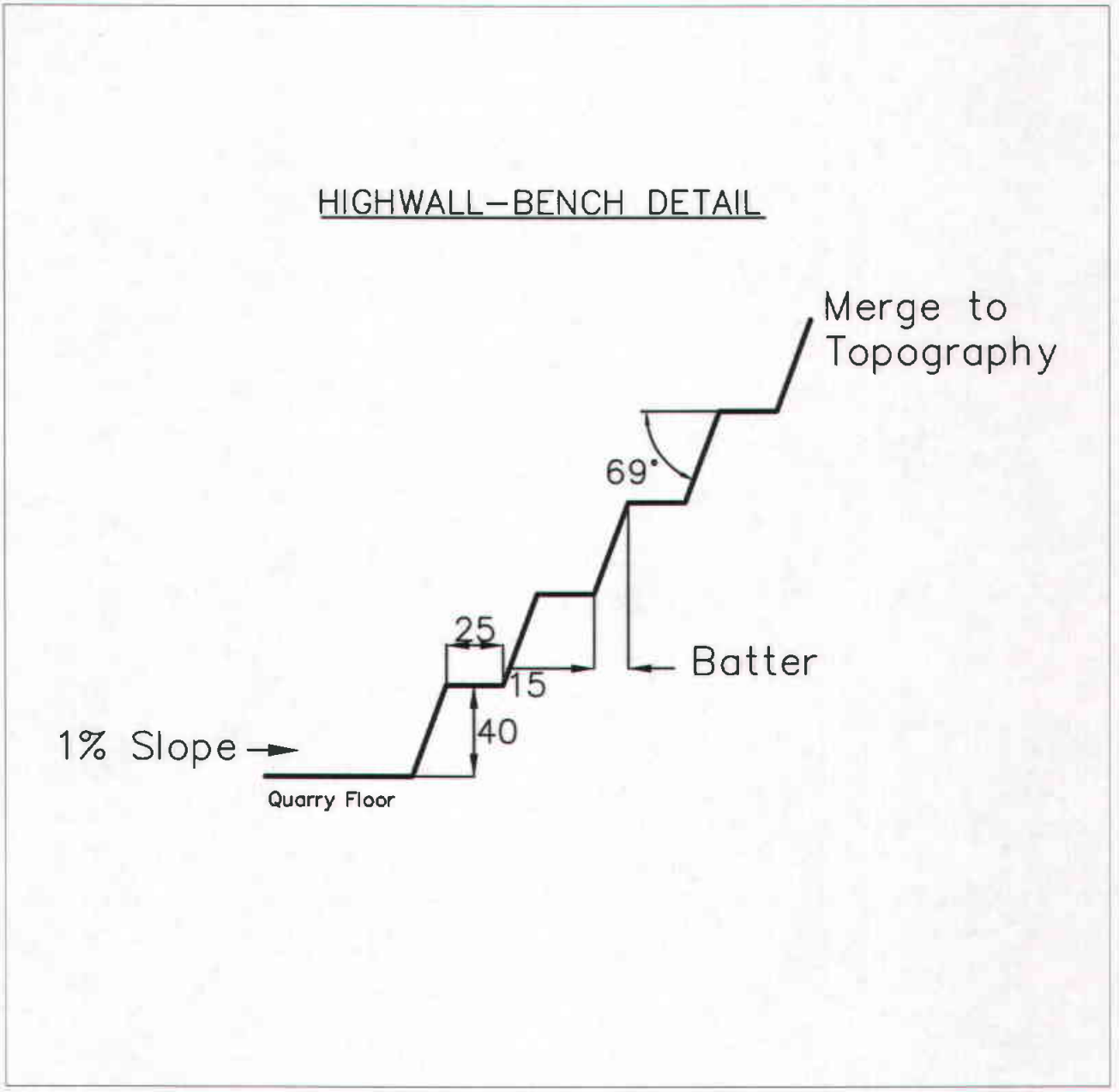
TITLE: N. Grantsville Quarry
Quarry Profile Sections

Revision: 00

ISSUED FOR INTERNAL REVIEW

Drawn: B SAMSON
Checked: BS/CC
Approved:
Date: 8-27-08
Dwg. No. CQ-5

N. GRANTSVILLE HIGHWALL BENCH DETAIL



Drawn: B. SUMSION	N. GRANTSVILLE QUARRY HIGHWALL BENCH DETAIL FIGURE 6a						Geneva Rock Products, Inc. N. Grantsville Quarry Project DOGM Permit Application	Geneva Rock Products, Inc. 1565 West 400 North Orem, Utah 84057
Approved:								
Date: SEPT. 16, 2009		Dwg. No.:						
Dwg. No.:			No.	Date:	Description:	By:		

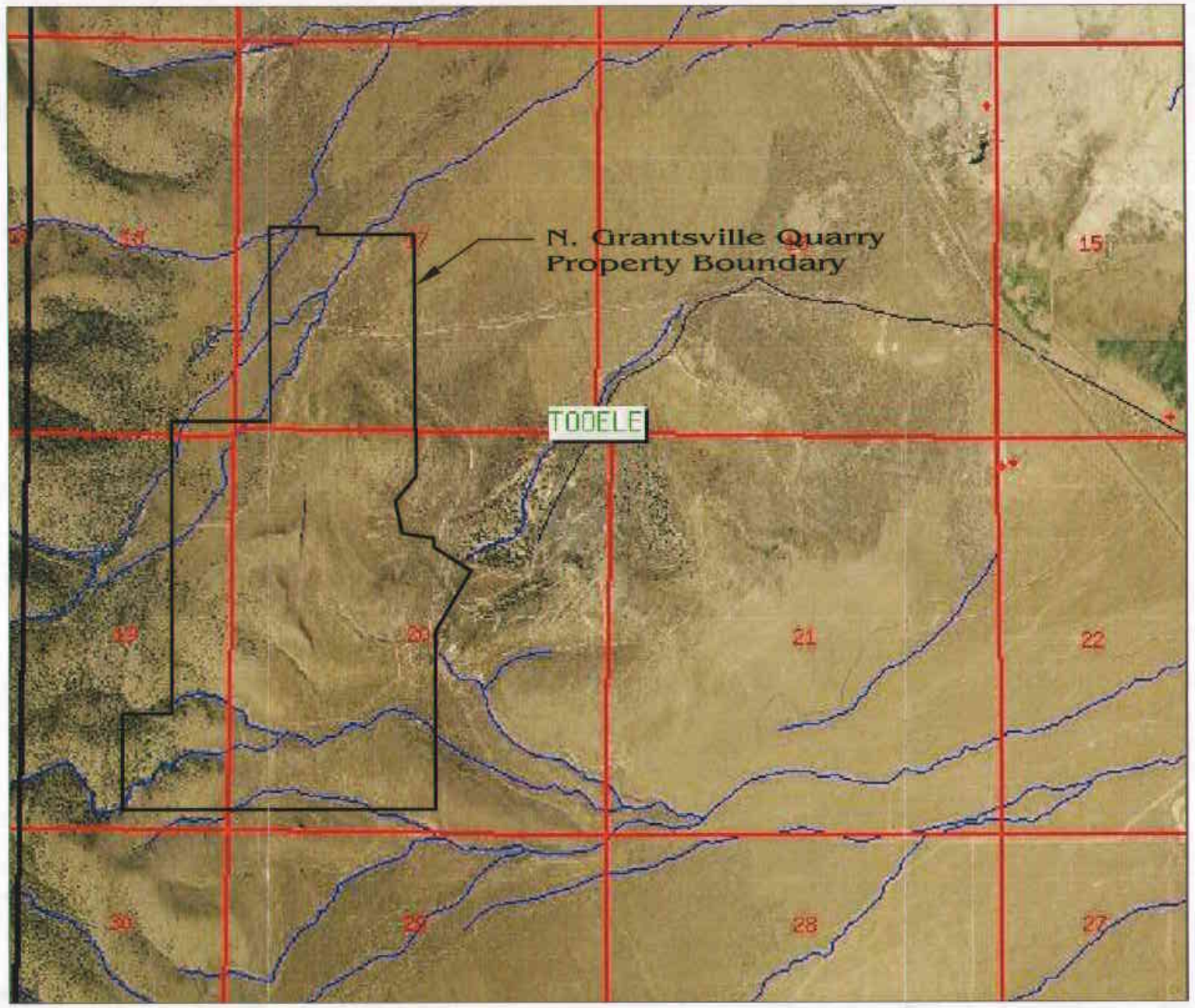
Water Rights Legend

Legend

- Wells
- Geologic Logs
- Search Boundary
- Counties
- Townships
- Sections
- Primary Route
- Secondary
- Rural Roads
- Minor Roads
- Stream
- Ditch or Canal
- Wash or Ephemeral Drain
- Intermittent Stream
- Aqueduct

N

Scale 1"=2000'



Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800

Geneva Rock
NOI N. Grantsville Quarry
Figure 7

Drawn:	B SUMSION	TITLE: N. Grantsville Quarry Water Rights Map	Engineer:		
Checked:	BS/CC				
Approved:					
Date:	9-1-09	ISSUED FOR INTERNAL REVIEW	Revision: 00		
Dwg. No.	023-9				

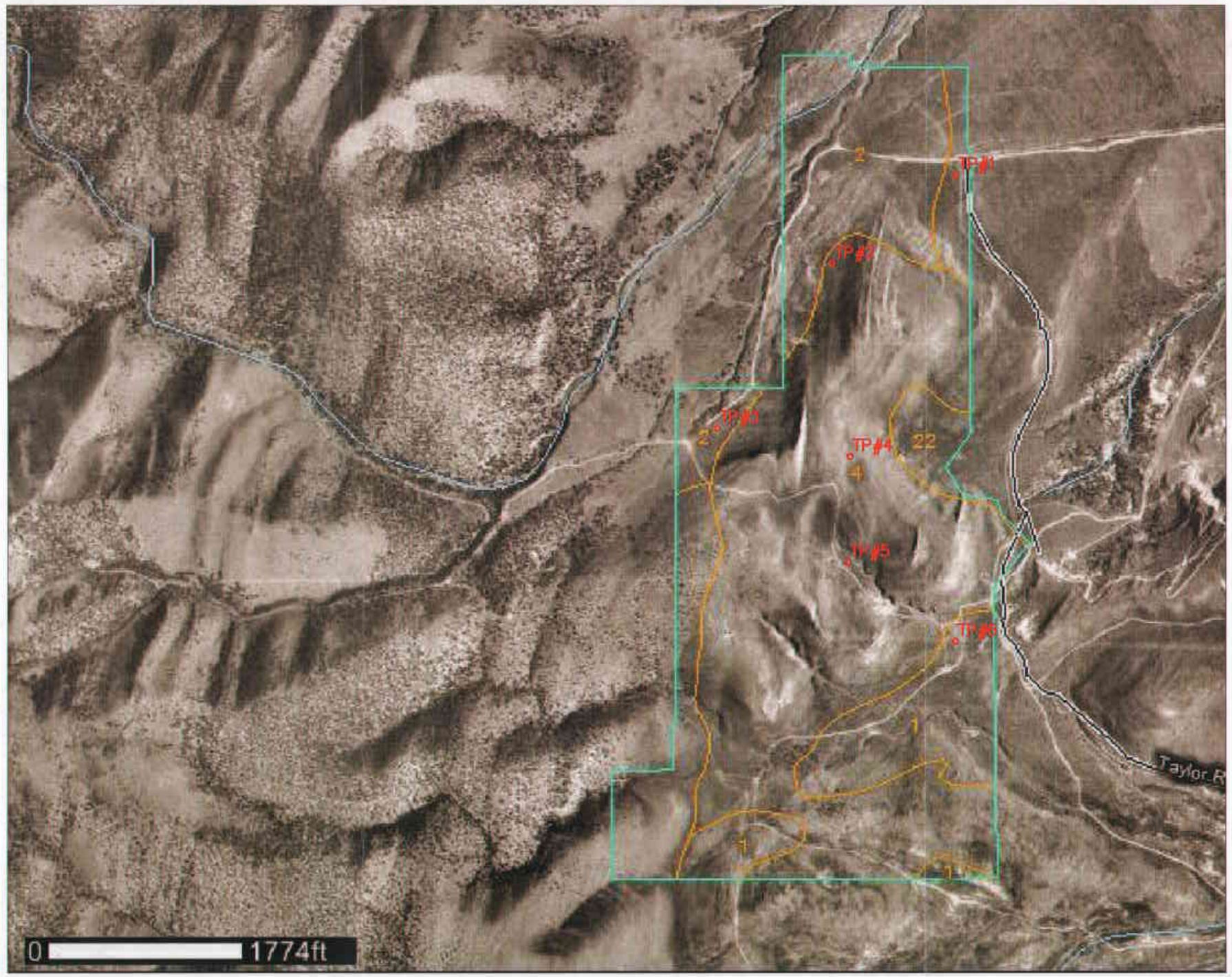
NO.	DATE:	DESCRIPTION:	BY:

Soil Map Legend

Map Unit Legend			
Tooele Area, Utah - Tooele County and Parts of Box Elder, Davis and Juab Counties (UT611)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
1	Abela gravelly loam, 2 to 8 percent slopes	51.6	12.3%
2	Abela very gravelly loam, 5 to 15 percent slopes	73.5	17.6%
4	Amtoft-Rock outcrop complex, 30 to 70 percent slopes	238.9	57.1%
22	Hiko Peak very stony loam, 2 to 8 percent slopes	21.3	5.1%
38	Lodar-Lundy-Rock outcrop association, 30 to 60 percent slopes	33.1	7.9%
Totals for Area of Interest		**418.4**	**100.0%**

N

Scale 1"=1200'



Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800

GENEVA ROCK

Geneva Rock
NOI N. Grantsville Quarry
Figure 8

NO.	DATE:	DESCRIPTION:	BY:

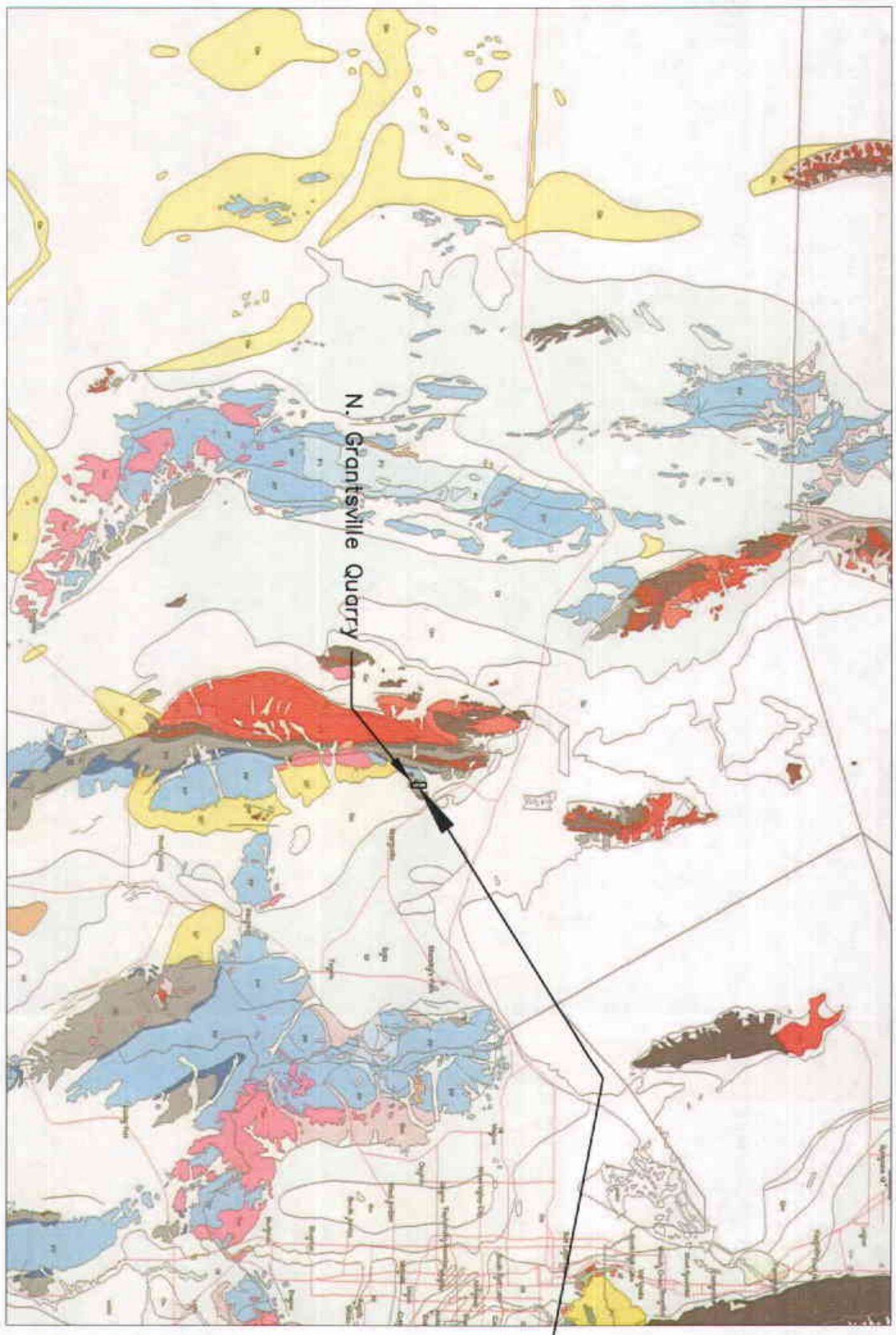
Engineer:

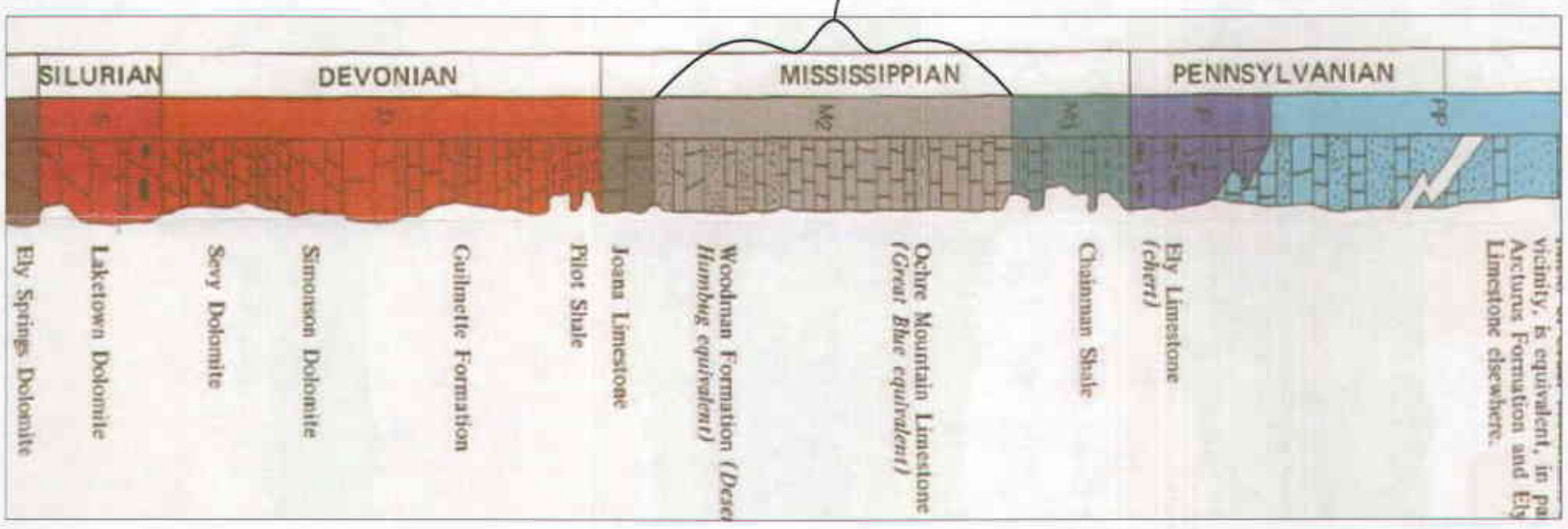
TITLE: N. Grantsville Quarry Soil Map

Revision: 00

ISSUED FOR INTERNAL REVIEW

Drawn: B SUMSION
Checked: BS/DC
Approved:
Date: 6-1-09
Dwg. No. C23-9





Drawn: B SUMSION	TITLE: N. Grantsville Quarry Geologic Map		Engineer:					Geneva Rock NOI N. Grantsville Quarry Figure 9
Checked: BS/CC								
Approved:								
Date: 8-1-09	ISSUED FOR INTERNAL REVIEW	Revision:						
Dwg. No. CCI-9		00		NO.	DATE:	DESCRIPTION:	BY:	

Geneva Rock Products, Inc.
1556 West 400 North
Orem, Utah 84057
801-765-7800

This page is a reference page used to track documents internally for the Division of Oil, Gas and Mining

Mine Permit Number M/045/0077 Mine Name N. GRANTSVILLE QUARRY
Operator GENEVA Date Rec'd Sept. 23, 2009
TO _____ FROM _____

X CONFIDENTIAL __BOND CLOSURE __LARGE MAPS __EXPANDABLE
__MULTIPUL DOCUMENT TRACKING SHEET __NEW APPROVED NOI
__AMENDMENT _OTHER _____

Description YEAR-Record Number

X NOI __Incoming __Outgoing __Internal __Superceded
CULTURAL SURVEY 2009-0001

CONFIDENTIAL

___NOI __Incoming __Outgoing __Internal __Superceded

__NOI __Incoming __Outgoing __Internal __Superceded

__NOI __Incoming __Outgoing __Internal __Superceded

__TEXT/ 81/2 X 11 MAP PAGES __11 X 17 MAPS __LARGE MAP

COMMENTS: _____

CC: _____

STORM WATER MANAGEMENT PLAN

N. Grantsville Quarry
Tooele County, Utah

Prepared for:
GENEVA ROCK PRODUCTS, INC

Prepared by

CLYDE COMPANIES INC.

CLYDE COMPANIES INC.
730 NORTH 1500 WEST
OREM, UT 84057
(801) 802-6900

TABLE OF CONTENTS

APPENDICES

1.0 BACKGROUND

1.1 UPDES Permit

In 1972, Congress passed the Federal Water Pollution Control Act (FWPCA), also known as the Clean Water Act (CWA), to restore and maintain the quality of the nation's waterways. The ultimate goal was to make sure that rivers and streams were fishable, swimmable, and drinkable. In 1987, the Water Quality Act (WQA) added provisions to the CWA that allowed the EPA to govern storm water discharges from industrial activities. EPA published the final notice for Phase I of the Multi-Sector General Storm Water Permit program (Federal Register Volume 60 No. 189, September 20, 1995, page 50804) in 1995 which included provisions for the development of a Storm Water Pollution Prevention Plan (SWPPP) by each industrial facility discharging storm water, including ready mix concrete facilities, asphalt production facilities, and sand and gravel mining operations.

The Utah Division of Water Quality developed the state-wide Utah Pollutant Discharge Elimination System (UPDES) program based on the federal standards. Utah is now in charge of its own state program – that is, it has "primacy" over the federal program.

The UPDES Permit is the mechanism Utah uses to regulate "point-source" discharges[1], including storm water discharges, to surface waters of the State. The SWP3 provides a site-specific, operator-driven set of pollution control standards for any discharges that occur at a particular industrial facility. A state-side "General Industrial Storm Water Permit" provides a blanket UPDES permit to those operators who certify that their SWP3 meets the standards set out in the UPDES program. The program has different standards depending on the industrial sector involved.

1.2 Waiver

This facility does not discharge storm water and is not required to obtain a UDPES permit. The facility shall be inspected and evaluated for the necessity of a permit whenever:

1. There is a significant change in the acreage disturbed; or a significant change to the design, construction, operation, or maintenance of on-site facilities that could have a significant effect on the quantity of runoff;
2. The inspection reveals a new discharge of water or one that has not previously been recognized by facility personnel.

If the evaluation reveals that the facility is not longer capable of containing runoff, and a significant discharge is found, then a UPDES permit shall be acquired and a SWP3 shall be implemented. The SWP3 shall be specific to the site and follow the guidelines as outlined for the sector under which the facility operates (J: Sand and Gravel Operations).

2.0 STORM WATER MANAGEMENT PLAN (SWMP)

Clyde Companies has prepared a general Storm water Management Plan that is adaptable to most Geneva Rock facilities. Development, implementation, and maintenance of this Storm water Management Plan will provide Geneva Rock with the tools to reduce pollutants contained in storm water at the facility.

The primary goals of the SWMP are to:

[1] A "point source" discharge is a flow of water or effluent that enters a stream or river from a particular identifiable location, rather than "non-point source" discharge, such as overland flow, which comes from several locations, such as runoff from an agricultural field or pasture.

- Identify potential sources of pollutants that affect storm water at the site;
- Describe the practices that will be implemented to prevent or control the release of pollutants in storm water;
- Evaluate the plan's effectiveness in reducing the pollutant levels in storm water.
- Train employees on effective storm water management

2.1 Facility Contacts

A list of facility contacts along with emergency reporting procedures can be found in **Appendix A** section of the document.

2.2 Facility Maps

Figures Section contains maps specific to this facility which show: location, size, operations, and runoff environment.

3.0 POLLUTANT SOURCES

3.1 Inventory of Materials

Materials used by the facility that have the potential to be present in storm water runoff are listed in the following table. This table includes information regarding material type, chemical and physical description, and the specific regulated storm water pollutants associated with each material.

Trade Name Material	Chemical/Physical Description	Storm Water Pollutants
Limestone, marl, chalk	White solid	Calcium carbonate, turbidity
Lime	White to slightly yellowish solid	Calcium Oxide
Clay, sand, shale	Solid	Silicon, suspended solids, turbidity
Bauxite, iron ore, recycled metals	Solid	Aluminum, iron, tricalcium aluminate, tetracalcium aluminoferrite
Silicates	Fine powder	Dicalcium and tricalcium silicates
Gypsum (calcium and sulfur based mineral)	White solid	Calcium sulfate
Waste fuel (motor oil, spent solvents, printing inks, paint residues, cleaning fluids, scrap tires)	Various colored liquids, pastes, and solids, petroleum hydrocarbons	Mineral oil, petroleum distillates

Workability agents, superplasticizers	Solid or aqueous solutions	Sulfonated melamine-formaldehyde, sulfonated naphthalene, formaldehyde
Air-entraining admixtures	Liquid	Alkyl benzene sulfonates, methyl ester-derived cocamide diethanolamine
Admixtures	Free flowing granules, gases, solids, liquids	Calcium chloride, ethanol amine, diethanolamine
Wastewater recovered from truck cleaning	Water	Oil & grease, solids, hydrochloric acid
Gasoline	Colorless, pale brown or pink petroleum hydrocarbon	Benzene, ethyl benzene, toluene, xylene, MTBE
Diesel Fuel		Nonane, Ethyltoluenes, Naphthalene

3.1.1 Practices used to minimize contact of materials with rainfall and runoff

- Material piles are kept in a compact shape to minimize surface area.
- Materials are stored on flat areas that do no pond, and on areas that drain into the drainage system whenever possible. No materials are stored within a drainage area.

3.1.2 Existing nonstructural controls that reduce pollutants in storm water runoff

- Regular maintenance of machinery and equipment minimizes spills and leaks.
- Quarterly inspections of fluid containers to check for leaks and deteriorations. Any leaks identified during the inspection will be immediately cleaned using a dry absorbent.
- An emergency spill kit with the supplies necessary to clean a fuel spill (a broom, a shovel, sand, saw dust, a 55-gallon drum) is stored in a convenient location near the fueling station area and in the shop so they will be immediately available in the event of a spill.
- A spill prevention plan is implemented as a resource to prevent spills, or in the event of a spill, to aid in the clean-up process. The plan addresses proper procedures and maintenance of the fuel and oil products and equipment, and identifies supplies and equipment for quick spill response.

3.1.3 Structural controls that reduce pollutants and storm water runoff

Structural controls that reduce contaminates in storm water runoff include: oil/water separators, retention ponds, berms/swales, and secondary containment for fuel/oil (see SPCC plans).

3.2 Risk Identification and Summary of Potential Pollutant Sources

3.2.1 Loading and unloading operations

- Sediment can fall from loaders while dump trucks are being loaded with soil or aggregate materials. Minor leaks can drain from equipment used at the loading site.

3.2.2 Outdoor manufacturing/process activities

- *Parking areas:* Employees park their vehicles in the parking lot area. Storm water from this area can be potentially contaminated by leaking fluids from the parked vehicles. These contaminants may contain mineral oil, petroleum, distillates, benzene, ethyl benzene, toluene, xylene, and MTBE.
- *Fueling areas:* Fueling activities are performed at the fuel storage areas. Storm water from these areas can be potentially contaminated by fluids leaking from the trucks during refueling activities and spills and leaks at the fueling station. These contaminants may contain mineral oil, petroleum distillates, benzene, ethyl benzene, toluene, xylene, and MTBE.
- *Sand and Gravel Truck Loading/Unloading areas:* Trucks unload sand and gravel in the sand and gravel truck unloading area. Storm water from this area can be potentially contaminated by fluids leaking on to the gravel surface from the trucks and by sand and gravel spills. These contaminants may contain mineral oil, benzene, toluene, xylene, MTBE, silicon, dissolved solids, suspended solids, calcium sulfate, tricalcium aluminate, and tetracalcium aluminoferrite.
- *Truck Washout area:* Truck drums and the exterior of trucks are cleaned in the truck washout area. Storm water from this area can be potentially contaminated by waste water from truck cleaning operations and by leaking fluids from trucks. These contaminants may contain mineral oil, benzene, MTBE, silicon, suspended solids, calcium sulfate, calcium oxide, sulfonated melamine-formaldehyde, alkyl benzene sulfonates, and methyl-ester-derived cocamide diethanolamine.

3.2.3 Dust/particle generating activities

- Dust is generated as materials are loaded/unloaded, moved from one stockpile to another, and transferred by conveyer belt. Dust is also generated by vehicles traveling on the unpaved roads between facility operations. All roads and materials are sprayed to control fugitive dust and all activities occur within the perimeter of the facility, so the sediments that may contaminate storm water runoff will remain onsite.

3.2.4 On-site waste disposal practices

- Sources of waste include office waste, employee lunch waste, small lubricant cans and buckets, cloths used for cleaning, etc... Any of these waste sources could become scattered across the site due to wind, inadequate disposal containers or sloppy employee housekeeping. Trash cans are provided and emptied on a regular basis to ensure no storm water is adversely affected.

3.2.5 Miscellaneous liquid sources/activities

- Vehicle maintenance takes place in a concrete floored shop when available. All in-shop oil is stored on spill pallets or within a secondary containment area. To avoid spills, all used oil filters, fuel filters, etc. are drained to drums for recycling prior to disposal; in some shops a lube pit is used during maintenance to catch spills; and dry cleanup methods are employed to minimize the chance that storm water will contact maintenance materials. A spill kit is maintained in case a spill occurs during maintenance activities.

4.0 MEASURES AND CONTROLS

This section discusses the storm water management controls implemented at the facility and describes the management practices selected to address the areas of concern identified in Section 3 of this SWMP.

4.1 Good Housekeeping

Good housekeeping Best Management Practices (BMPs) refers to ongoing or regular practices that ensure that areas of the facility with a potential to contribute pollutants to storm water are kept clean and orderly. The following comprise some of the good housekeeping practices that are routinely followed:

- Litter is controlled through employee awareness, trash receptacle placement, and frequent cleanup, among other controls. New employees are instructed in litter control as part of their initial Geneva training. Wind blown litter and other debris is periodically cleaned up from the entire facility.
- Servicing of vehicles and mobile equipment is conducted within the main shop area. Used oil is stored in a tank and is then recycled. All other new and used lubricants, liquids and supplies are inventoried and stored in tanks and drums that are within spill containment.
- Fueling takes place in designated areas away from surface water collection areas.
- To reduce the chance of spills during fueling, the equipment operator remains at the fueling point while the tank is being filled. All valves are opened immediately prior to, and closed immediately after, fueling.
- Tanks and drums are refilled and/or re-supplied between once a day and once a week by a contractor. All tanks and drums are secondarily contained.
- A spill kit is maintained on site to absorb any spilled fuel
- A detailed description of preventive and clean-up measures for fuel and oil spills can be found in the SPCC which is kept on site at all times.

4.2 Preventive Maintenance

- Vehicles, equipment, and machinery are kept in good working order so that their likelihood of discharging fluids that could contact storm water is minimized.
- Water systems used in dust control are regularly maintained to avoid small, chronic leaks or larger-volume releases.
- Earthen slopes and retention berms/swales are maintained in order to reduce erosion and storm water transport of their materials as well as continue to serve their intended function.
- The inspection procedures discussed in Section 4.4 ensure that items requiring maintenance are identified. If maintenance is needed, items are repaired as soon as practicable. During the next inspection, special attention is paid to those items in order to verify that maintenance activities were adequately completed.

4.3 Other Controls

All wastes created during operations are removed from the area and disposed of appropriately. No trash or other pollutants will be buried on site. All applicable Federal, State and/or local waste disposal regulations will be complied with.

Any gasoline, diesel fuels, lubricants, and other potential pollutants stored on the property are stored in double-walled tanks. Grease, oil, and lubricants are stored within an enclosed shop and are inventoried on a regular basis.

4.4 Inspections

Once a quarter, material handling and storage areas, drum storage areas, conveyors, hoppers, and stockpile areas are inspected to assure that there are no leaks, fuel or oil deposition areas, or other signs that hydrocarbons are uncontrolled. Storm water control structures and equipment such as berms, sediment control and collection systems, and containment structures are also inspected to ensure continued proper operation. Inspections are conducted quarterly during each of the following periods: January to March, April to June, July to September, and October to December.

A blank inspection report form is located in **Appendix C** and will be completed and signed by the inspector at the time of each inspection. If the inspection report describes deficiencies in pollution control equipment, structures, or procedures, the deficiencies will be corrected as soon as possible following the inspection, and prior to the next anticipated significant storm event. A description of all actions and shall be documented and retained as part of this plan. Geneva will retain copies of the completed inspection reports (**Appendix D**) for a minimum of three years from the date of inspection.

As stipulated in the SPCC Plan, fuel and oil products, and their containment systems will be inspected in accordance with the SPCC Plan inspection schedule.

4.5 Employee Training

An employee training program will be developed and implemented to educate employees about the requirements contained in these plans and other plans relating to storm water and spill prevention. This education program will include the following:

- Background on the components and goals of storm water pollution prevention
- Hands-on training in spill prevention and response
- BMPs to be used at the facility
- Education on storm water pollution prevention
- Question and answer session
- Other topics considered pertinent during each session

All new employees will be trained within one week of their start date. Additionally, employees will be required to participate in an annual refresher training course. An employee sign-in sheet for the refresher course can be found in **Appendix E** of this document. The training program will be reviewed annually to determine its effectiveness and to make any necessary changes to the program. Training records shall be retained for a minimum of three years.

4.6 Record Keeping and Internal Reporting Procedures

Records described in this plan must be retained on site for a minimum of 3 years, and shall be made available to the state or federal compliance inspection officer upon request. Additionally, employee training records shall also be maintained.

APPENDIX A

FACILITY CONTACTS AND REPORTING PROCEDURES

CONTACT LIST

ED CLAYSON, SOUTH AREA CRUSHER SUPERINTENDANT
15800 SOUTH 500 WEST
BLUFFDALE, UT 84065

OFFICE 801-281-7956
CELL 801-592-2003
EMAIL – ECLAYSON@GENEVAROCK.COM

CLYDE SORENSEN, AGGREGATE PRODUCTION MANAGER
15800 SOUTH 500 WEST
BLUFFDALE, UT 84065

OFFICE 801-281-7957
CELL 801-633-6667
EMAIL – CSORENSEN@GENEVAROCK.COM

CARL CLYDE, V.P., GRAVEL & ASPHALT MATERIALS
15800 SOUTH 500 WEST
BLUFFDALE, UT 84065

OFFICE 801-281-7979
CELL 801-592-5608
EMAIL – CCLYDE@GENEVAROCK.COM

REPORTING PROCEDURE - ANY INCIDENCE OF STORM WATER CONTAMINATION OR DISCHARGE OF STORMWATER FROM THE PROPERTY SHOULD BE REPORTED IMMEDIATELY TO ONE OR MORE OF THE ABOVE INDIVIDUALS.

APPENDIX B

FACILITY MAPS

APPENDIX C

INSPECTION REPORT FORMS

Quarterly Visual Inspection Form

	Geneva Rock Products
Inspectors Name:	Location:
Inspection Date:	Inspection Time:

Directions: Perform a walk-through of the facility when rain is not falling and check YES or NO for each item. Record any corrective actions that are needed. Review the SWPPP and complete Section 4. Describe the corrective actions that were taken in Section 5.

1. Housekeeping	Yes	No	Corrective Actions/Maintenance Required
- Litter is picked up?			
- Trash receptacles no overflowing?			
2. Materials and Equipment	**Yes**	**No**	**Corrective Actions/Maintenance Required**
- Aggregate material storage piles located within the batch plant?			
- Process and mobile equipment positioned within the batch plant?			
- Obsolete equipment located in proper storage area?			
- Any signs of leakage from process, mobile, and obsolete equipment?			
- Preventive maintenance has been performed on mobile equipment?			
- Silos and storage tanks no leaking?			
- Secondary containment area in good condition (i.e., no cracks, no signs of leaks)?			
3. General	**Yes**	**No**	**Corrective Actions/Maintenance Required**
- Any evidence of erosion/			
- Perimeter berms in good condition?			
- Roads and parking lots in good condition (i.e., no erosion or ruts)?			
- Any new problem areas or potential pollutant sources?			

4. SWPPP Review

- If deficiencies were noted above, are changes to the SWPPP required? YES NO
- If yes, describe the revisions that were made: _____

5. Corrective Actions Taken

- For the corrective Actions/Maintenance Required that were identified above, enter the action that was taken and the date: _____

APPENDIX D

COMPLETED INSPECTION REPORT FORMS

APPENDIX E

EMPLOYEE TRAINING RECORDS

SWMP Training Sign-In Sheet

Date	Employee Name	Employee Signature